# ANALYSIS OF PRECEDENT

An investigation
of elements, relationships, and ordering ideas
in the work of eight architects

Roger H. Clark
Michael Pause

and
Twenty Students of the School of Design

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# ANALYSIS OF PRECEDENT

This volume is a collection of diagrams which systematically analyze the works of eight architects. For each architect four representative buildings have been documented. The architects were purposefully selected from various periods of time to represent seemingly different approaches to architecture.

Diagrams have been utilized to capture the essence of particular issues for each building. The issues studied are divided into three categories: elements, relationships, and ordering ideas. Physical attributes which can be compared independent of building type or function have been addressed in the diagrams. The analysis is not all inclusive in that it is limited to characteristics which can be diagrammed; thus, material palette is one obvious omission. Our analysis and interpretation has been of built form and therefore may not necessarily coincide with the architects intentions or the interpretation of others. In order to make the diagrams memorable, they have been intentionally simplified. Likewise the accompanying text has been abbreviated to reinforce the information contained in the diagrams.

Presentation of the diagrams permits this document to be used for the understanding of one building, one architect, or an approach to an idea by several architects.

The intentions of the study are to assist the understanding of architectural history, to examine the basic similarities and differences of architects' designs over time, to identify generic solutions to design problems which transcend style, and to develop analysis as a tool for design. Of paramount importance is the development of a vehicle for the discussion of design ideas through the use of example.

The material in this volume began as a graduate architecture seminar presented by the authors. This seminar was generated by the observations that the concept of parti was unfamiliar to many students and that while history is discussed it is seldom useful or applicable.

In the course of the seminar the designs of the following architects have been analyzed and diagrammed by these students:

| | |
|---|---|
| Alvar Aalto | - Polly Hawkins |
| Le Corbusier | Scott Haywood & Steve Varenhorst |
| Romaldo Guirgola | - Donald Self |
| Hardy, Holzman & Pfeiffer | - Joseph Prefontaine |
| Arata Isozaki | - William Moore |
| Thomas Jefferson | - Vickie Cable |
| Louis Kahn | - Jacqueline Blalock-James |
| Sir Edwin Lutyens | - Grimsley Hobbs |
| Richard Meier | - Stephen Hepler |
| Charles Moore | - Paul Haynes |
| Andrea Palladio | - Kevin Utsey |
| H. H. Richardson | - Louise Oldenberg |
| Roche/Dinkeloo | - Molly Hester |
| James Stirling | - Michael McMurphy |
| Louis Sullivan | - Betsy Pettit |
| Kenzo Tange | - David Riddle |
| Aldo Van Eyck | - Matthew Norman |
| Robert Venturi | - Roger Cannon |
| Frank Lloyd Wright | - Sathit Choosang |

We are indebted to these students in helping us develop the technique for analysis, but for this publication we have totally re-analyzed the work of the architects, developed new diagrams, and generated the text. The diagrams were drawn by Roger Cannon and Don Self, with the exception of some of the diagrams of Charles Moore's work, which were drawn by Paul Haynes. The work of these graduate students was supported in part by university research assistantships.

To the best of our knowledge the information presented here has not been previously available. By making the information available through this publication, we hope to expand the understanding of precedents in architecture, and to illustrate an educational technique that is useful to students, educators and practitioners.

April 16, 1979 Roger H. Clark
Michael Pause

## COMMENTARY

The fragmentation of architecture into the separate disciplines of design, criticism, history and education is a relatively recent phenomenon. The unfortunate result of this specialization has been the limitation of most architects' knowledge of history to little more than names and dates. Few architects have any real understanding of the evolution of architectural ideas or even what constitutes them, and thus are denied a vocabulary that has been developed and tested over time. This introduction into the study of architectural ideas is an important step in bridging these artificial distinctions between practice and theory. By making comparisons easier and clearer, it should also help to separate that which is being attempted from the memos by which it is being achieved.

The following diagrams of architectural concepts at once reduce buildings to their essentials, intricate use programs to a few lines, and hundreds of complex relationships to a few important ones. This elimination of all but the most important considerations makes those that remain both dominant and memorable.

I believe designers benefit from a comprehensive understanding of the widest possible range of architectural organizational concepts or partis. One of the best ways of becoming familiar with these ideas is to study those used by important architects throughout history. The basic parti and its variations can provide the first step in recalling a building, comparing several schemes, or beginning a design. In addition, familiarity with the major partis should encourage the selection of ideas from a greater range of possibilities on the basis of their appropriateness in a particular situation. It should also facilitate the comparison of contemporary designs with solutions to similar problems throughout the history of architecture. It is no accident that our most creative architects are also often those who have the best working knowledge of architectural history (Charles Moore, Robert Venturi, Louis Kahn, etc.) or those who are working within an established historical context (Alvar Aalto), or both (Andrea Palladio).

Obviously, a sound organizational diagram will not lead inevitably to a good design any more than a classic chess opening will lead to certain victory, but a sound beginning can forestall an early defeat while greatly increasing the chances of an ultimate success.

George E. Hartman, Jr.
Washington, D.C.
13 December 1979

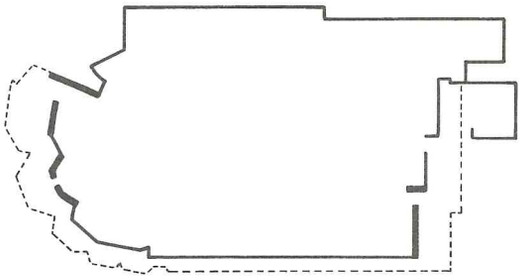
*George E. Hartman, Jr., FAIA, is a partner in Hartman-Cox Architects of Washington, D.C. and was elected to Fellowship by the American Academy in Rome in 1977.*

# ELEMENTS

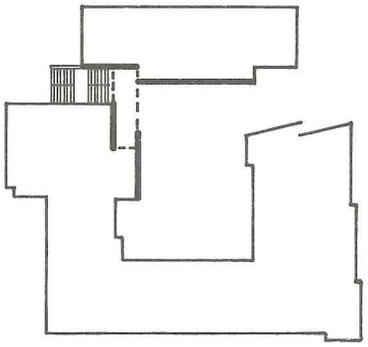
**ENTRANCE**
CIRCULATION
MASSING
STRUCTURE
SERVICES
SPACE DEFINITION
NATURAL LIGHT

**SUMMARY**

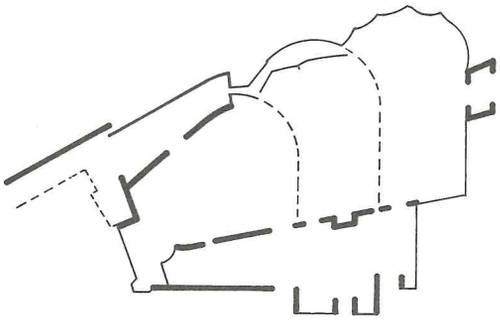
- Separated from dominant exterior form by indention into, or addition onto that form.
- Generally opaque.



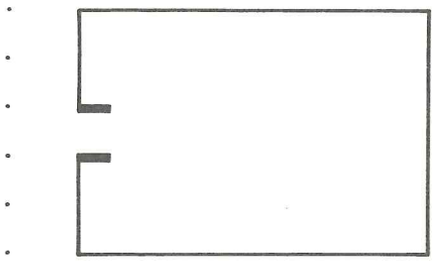
*Cultural Center*



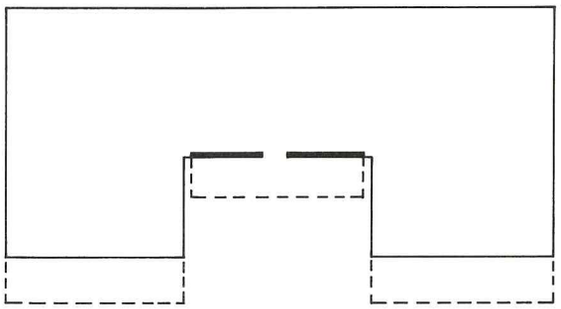
*Town Hall*



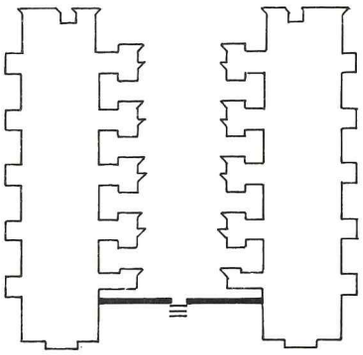
*Imatra Church*



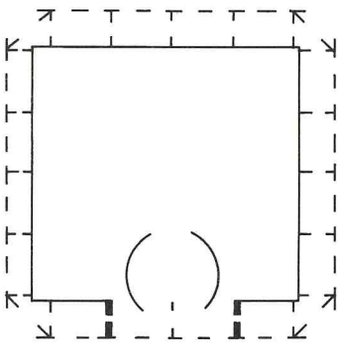
*Enso / Gutzeit*



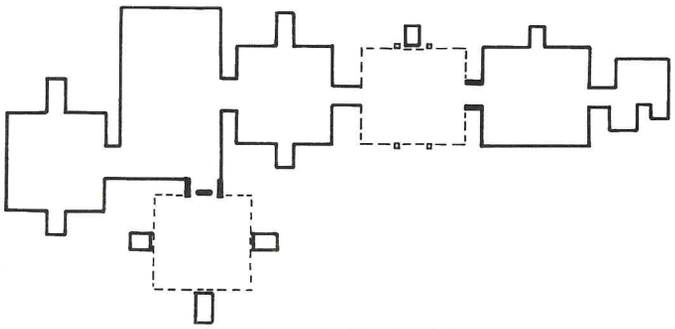
*Kimball Art Center*



*Salk Institute*



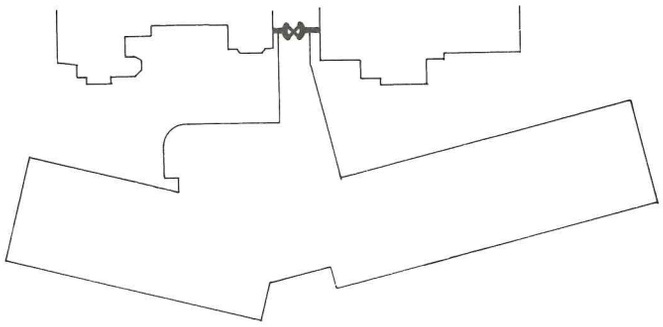
*Exeter Library*



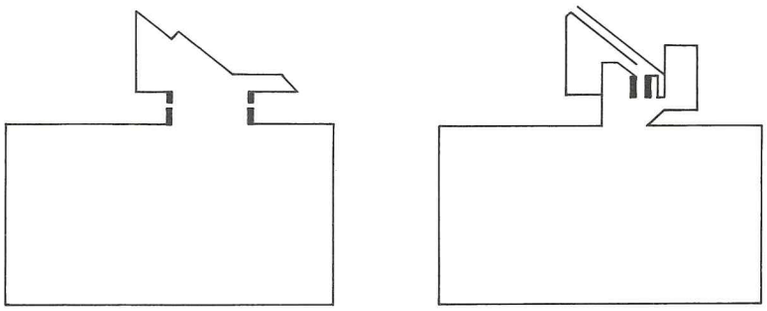
*Richards Medical Laboratory*

**SUMMARY**

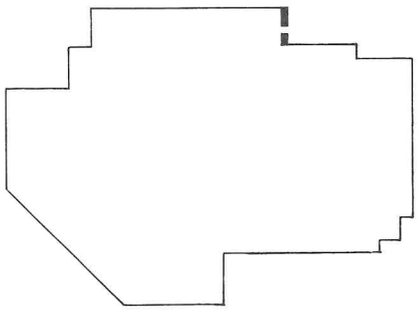
- Generally included in overall form so that it is encountered after passing under some part of building.
- Enter building prior to encountering doors which often do not enter directly into significant space.



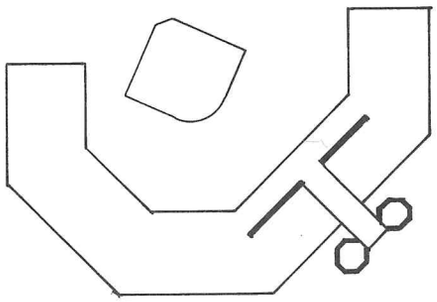
*Olivetti*



*Leicester*



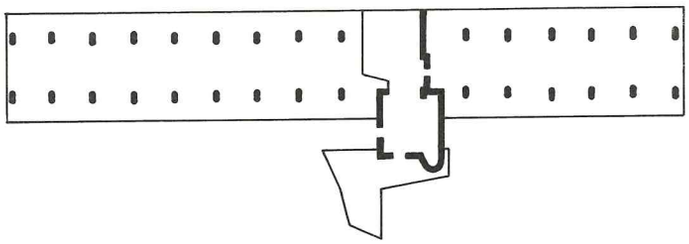
*Cambridge History*



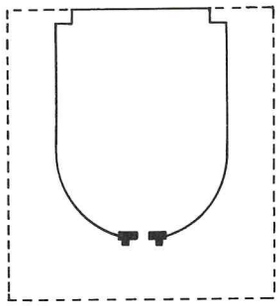
*Oxford Dorm*

**SUMMARY**

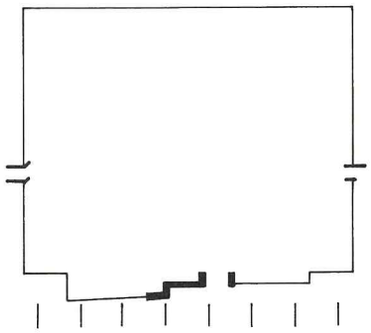
- Usually transparent.
- Often articulated as void between masses.



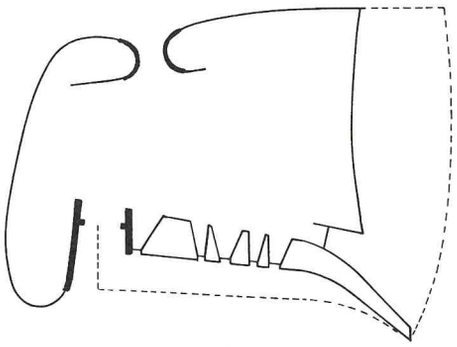
*Marseilles*



*Villa Savoye*



*Assembly at Chandigarh*



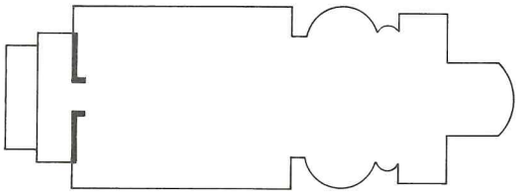
*Ronchamp*

**SUMMARY**

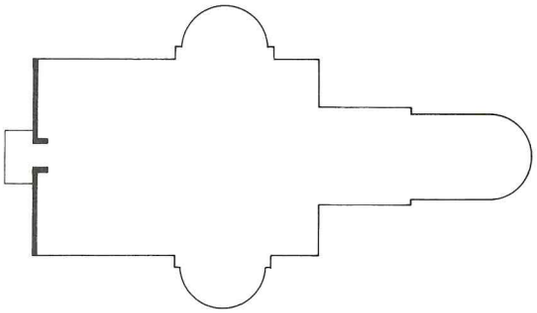
- Generally located between or under dominant forms.
- Often articulated by indention.

**SUMMARY**

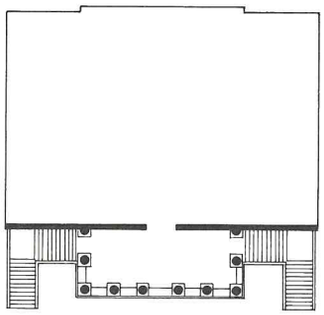
- Generally puncture in wall preceded by portico, stairs and pediments.



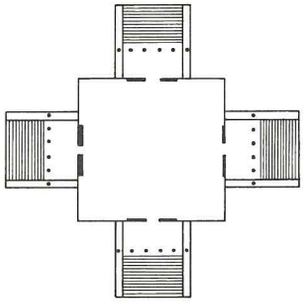
*Redentore*



*San Giorgio*



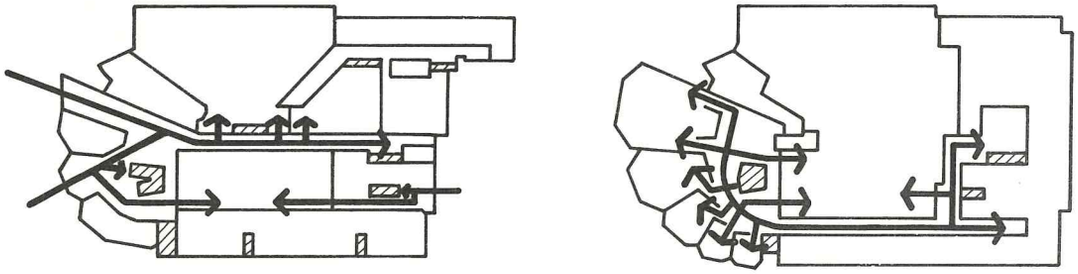
*Malcontenta*



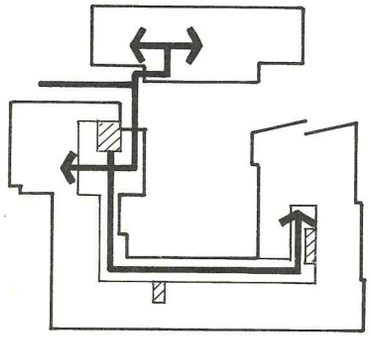
*La Rotonda*

**SUMMARY**

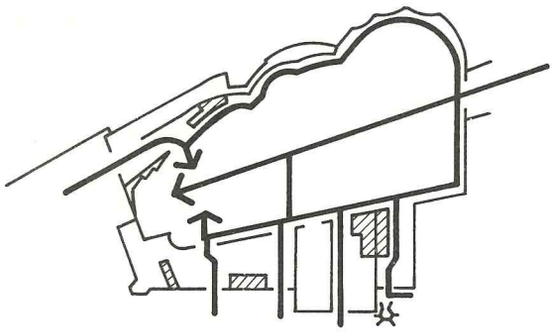
- Circulation routes clearly articulated and usually separated from use spaces.



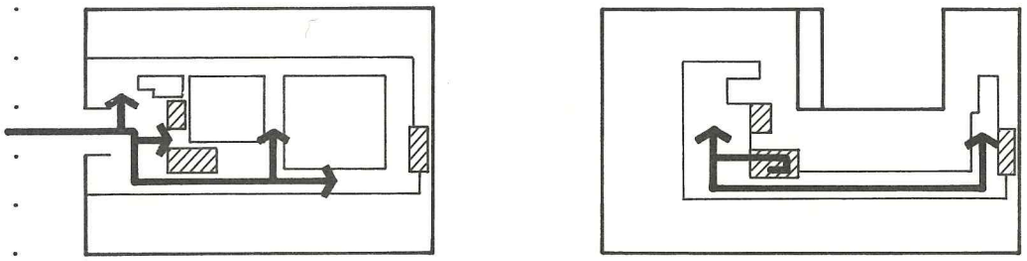
*Cultural Center*



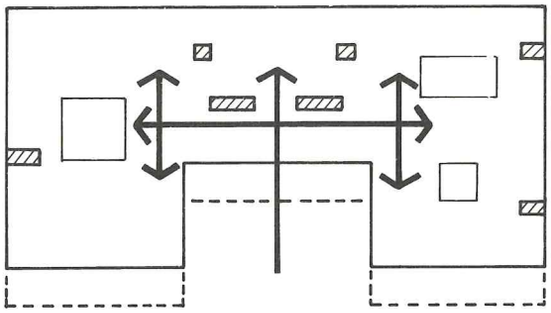
*Town Hall*



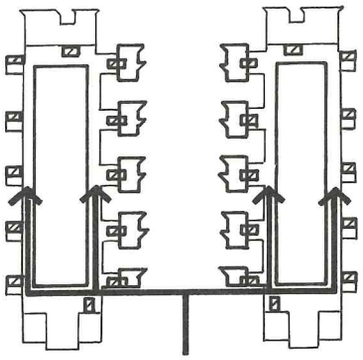
*Imatra Church*



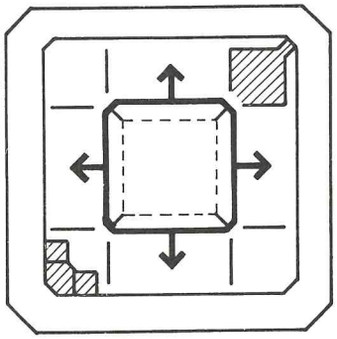
*Enso / Gutzeit*



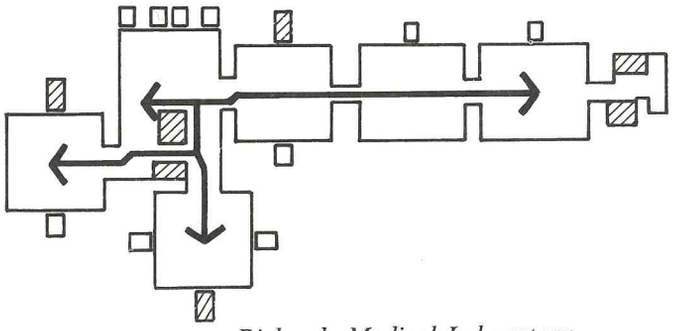
*Kimball Art Center*



*Salk Institute*



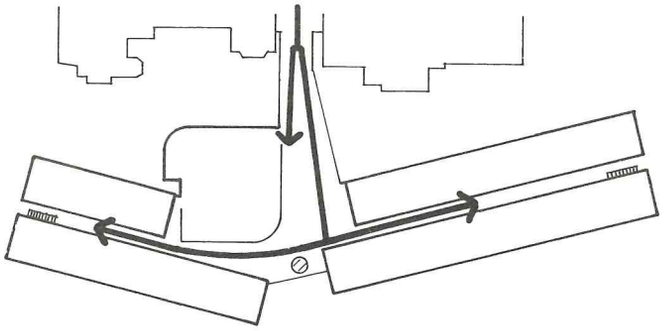
*Exeter Library*



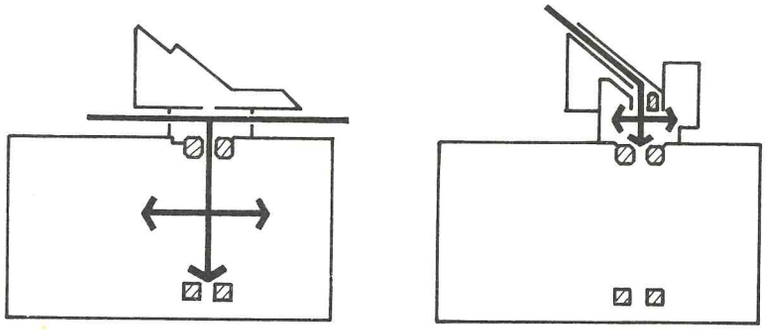
*Richards Medical Laboratory*

**SUMMARY**

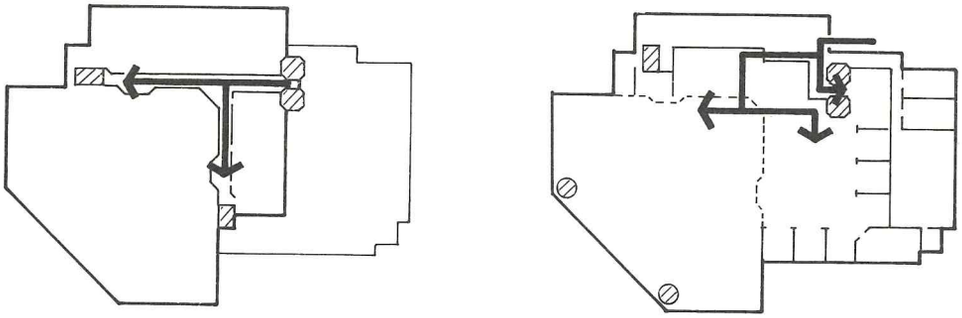
- Horizontal circulation coincident with geometric organization of built form.
- Vertical circulation is expressed as formal elements.



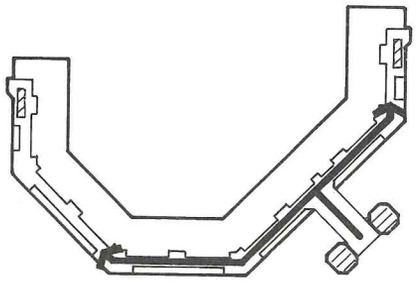
*Olivetti*



*Leicester*



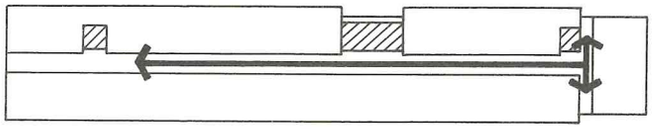
*Cambridge History*



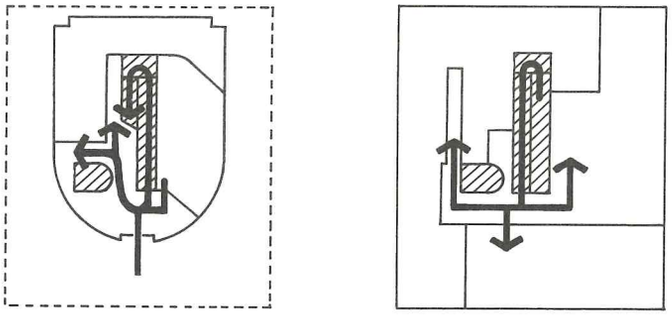
*Oxford Dorm*

**SUMMARY**

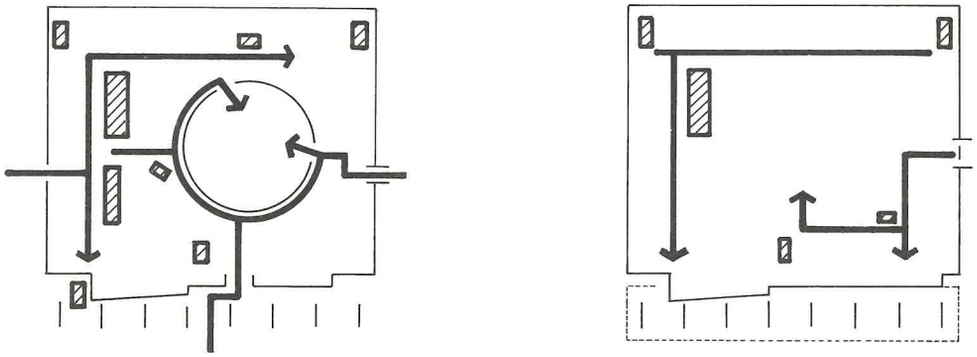
- Circulation routes usually transparent.
- Vertical circulation, where it occurs, in paired towers.
- Horizontal circulation articulated and separate from use spaces.



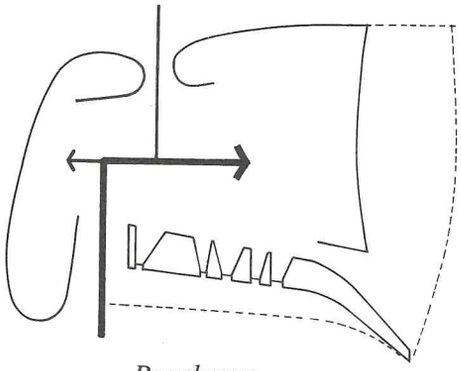
*Marseilles*



*Villa Savoye*



*Assembly at Chandigarh*



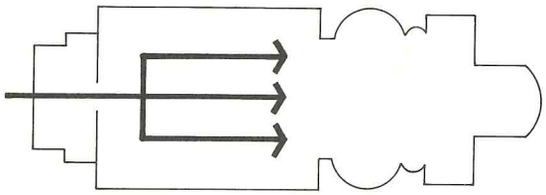
*Ronchamp*

**SUMMARY**

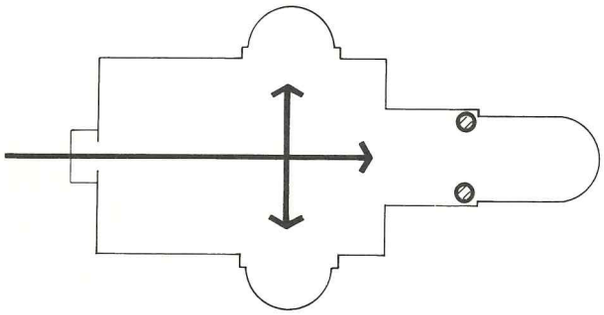
- Circulation routes both clearly articulated and separated from use spaces, and non-directional through use spaces.
- Generally this distinction coincides with private/public uses.

**SUMMARY**

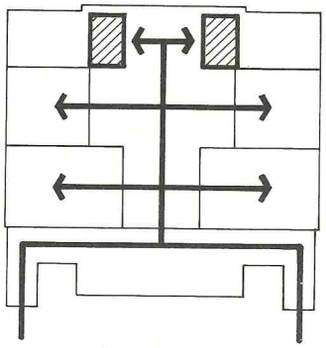
- Generally through use spaces. Vertical circulation located in thick wall configuration.



*Redentore*



*San Giorgio*



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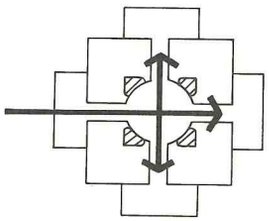
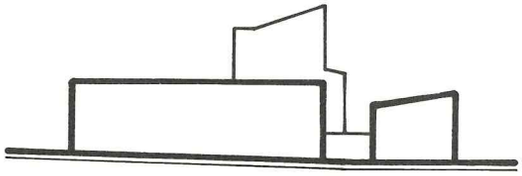


*La Rotonda*

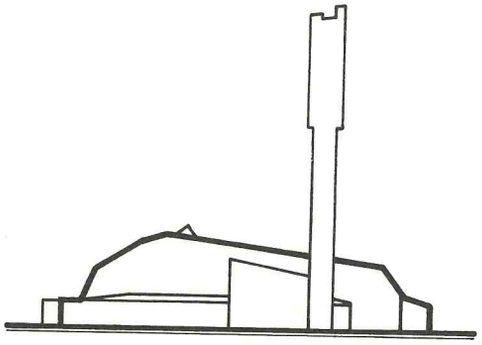
**SUMMARY**

- Usually complex profiles that are softened by a transition that mediates between roof and wall surfaces.
- Major spaces are dominant.

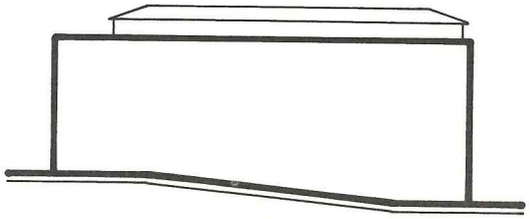
*Cultural Center*



*Town Hall*



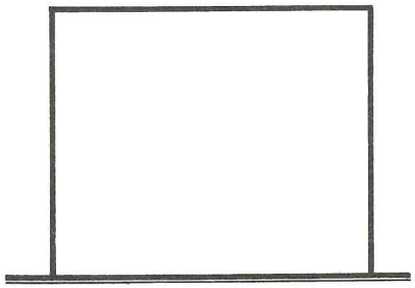
*Imatra Church*



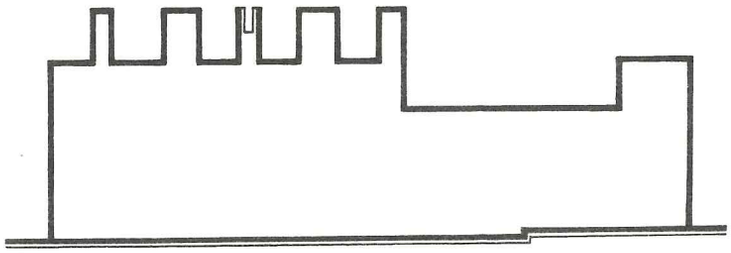
*Enso/Gutzeit*

*Kimball Art Center*

*Salk Institute*



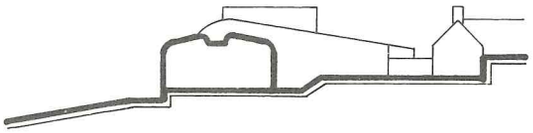
*Exeter Library*



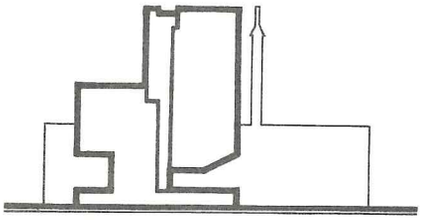
*Richards Medical Laboratory*

**SUMMARY**

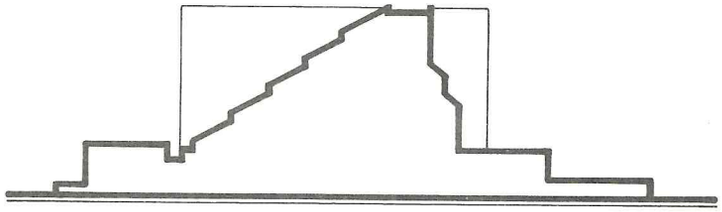
- Reinforces formal organization, i.e., Exeter Library is monolithic, Salk Institute is two built forms and courtyard, Richard Labs are a series of vertical shafts, Kimball Museum is a collection of vaults.



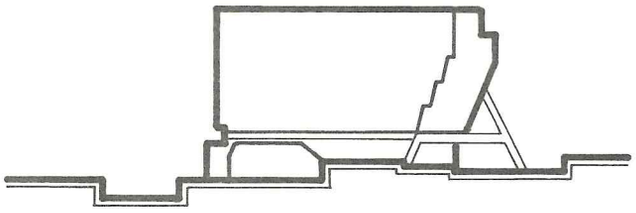
*Olivetti*



*Leicester*



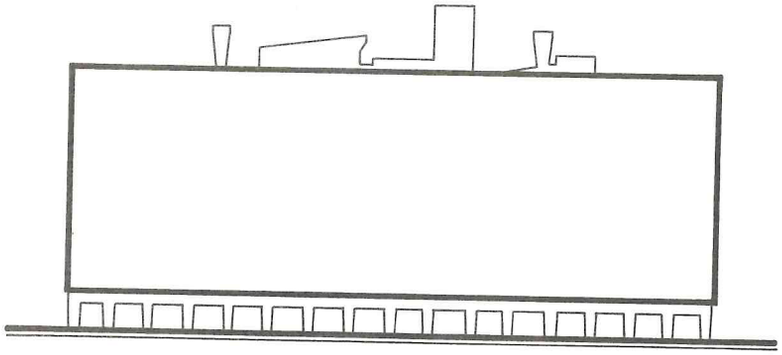
*Cambridge History*



*Oxford Dorm*

**SUMMARY**

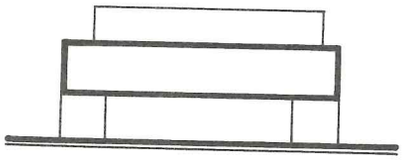
- Highly articulated and complex combinations of angles.



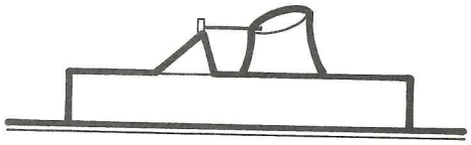
*Marseilles*

**SUMMARY**

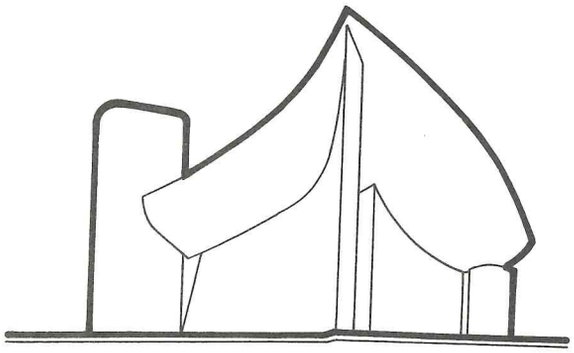
- Dominant form usually a simple configuration with a more complex series of forms that mediate between building and sky.



*Villa Savoye*



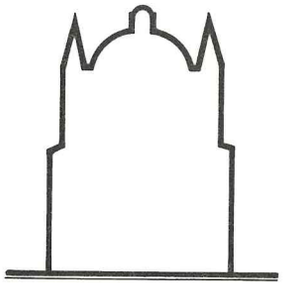
*Assembly at Chandigarh*



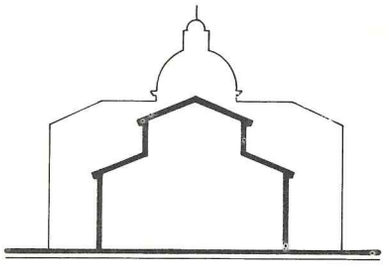
*Ronchamp*

**SUMMARY**

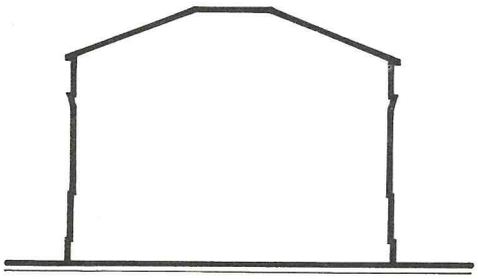
- Generally builds toward center.



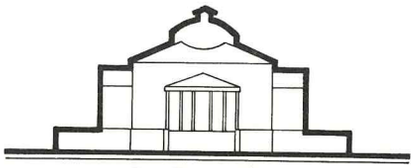
*Redentore*



*San Giorgio*



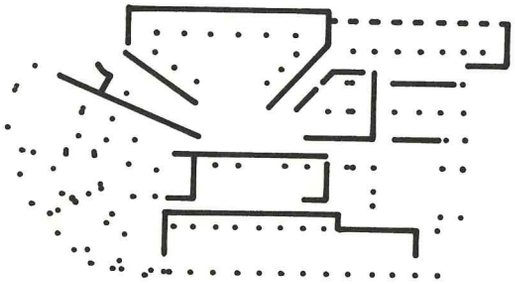
*Malcontenta*



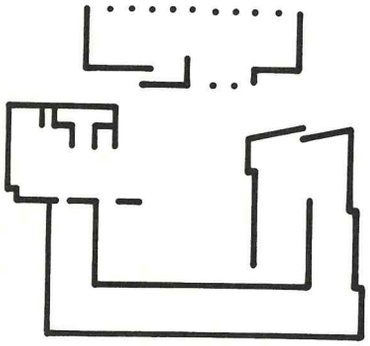
*La Rotonda*

**SUMMARY**

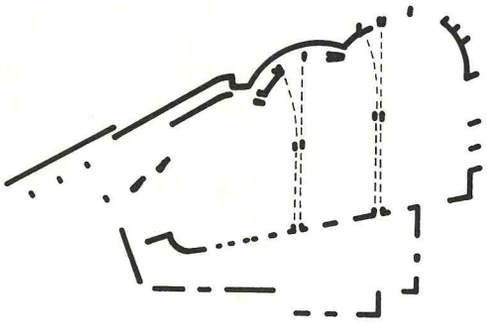
- Complex combinations of structural systems that are subordinate to formal considerations.



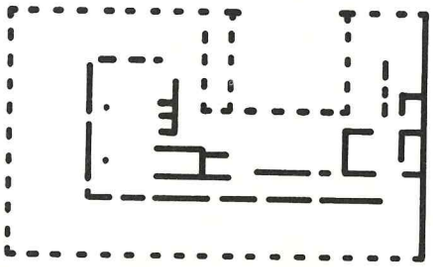
*Cultural Center*



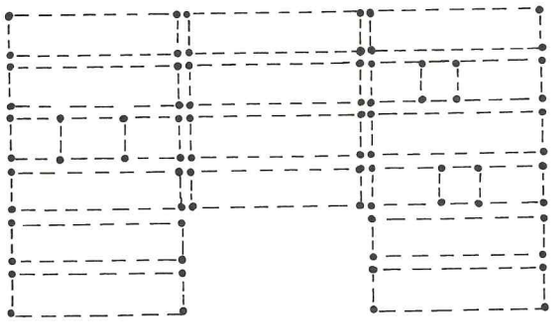
*Town Hall*



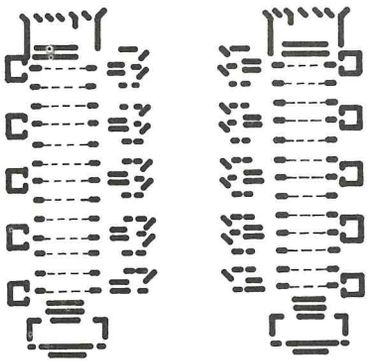
*Imatra Church*



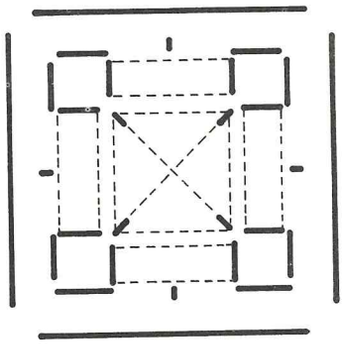
*Enso/Gutzeit*



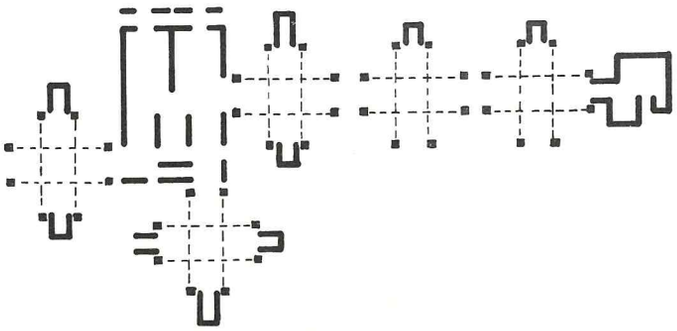
*Kimball Art Center*



*Salk Institute*



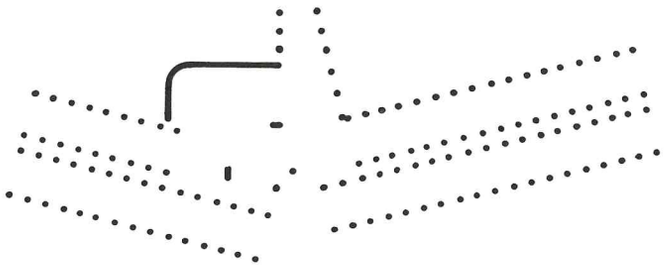
*Exeter Library*



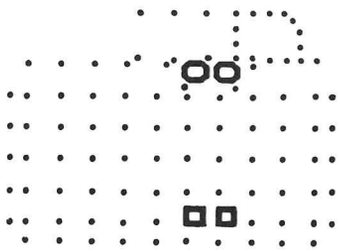
*Richards Medical Laboratory*

**SUMMARY**

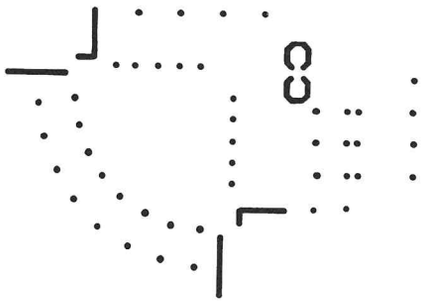
- Articulated and contributes to spatial organization.



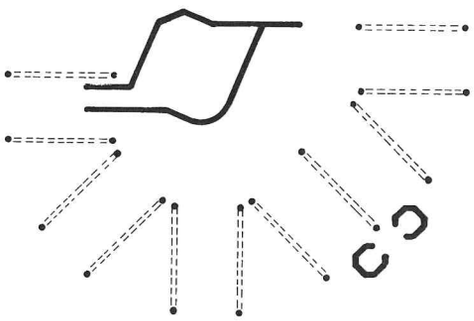
*Olivetti*



*Leicester*



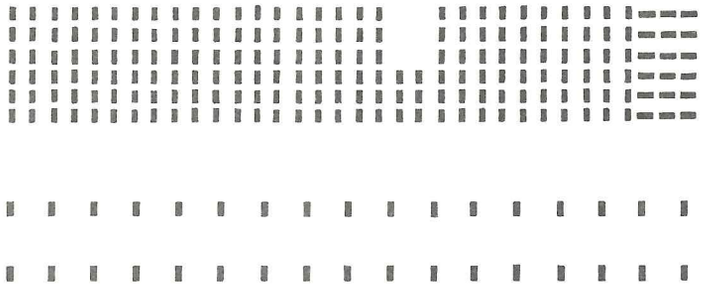
*Cambridge History*



*Oxford Dorm*

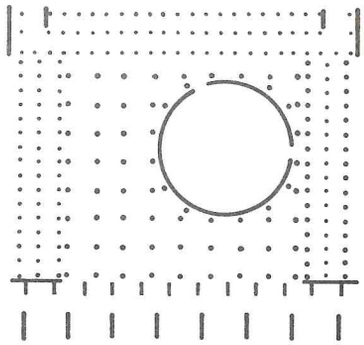
**SUMMARY**

- Usually ordered, columnar, and coincident with formal organization; on occassion used as space defining element.

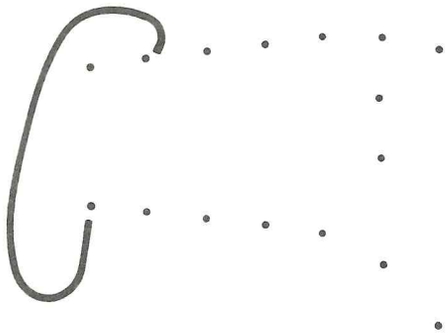


*Marseilles*

*Villa Savoye*



*Assembly at Chandigarh*



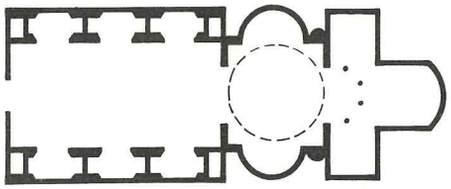
*Ronchamp*

**SUMMARY**

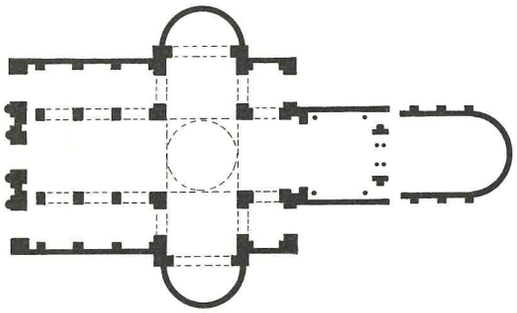
- Most often columnar structures.
- Generally on a grid and independent from walls.

**SUMMARY**

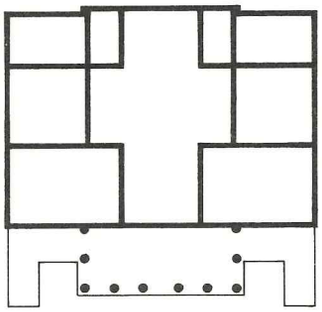
- Generally bearing walls used to define spaces.



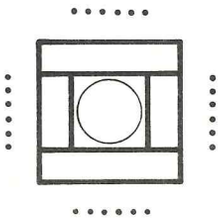
*Redentore*



*San Giorgio*



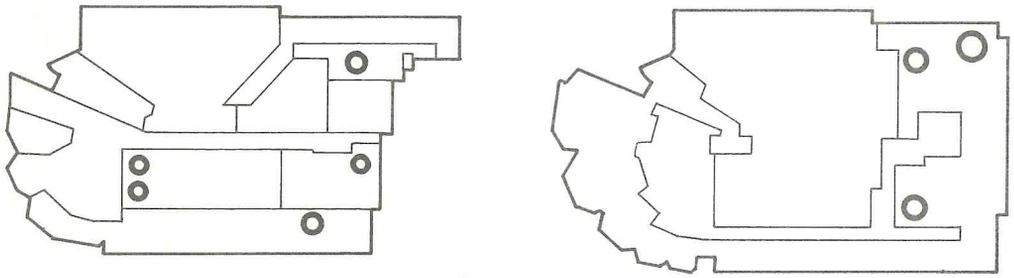
*Malcontenta*



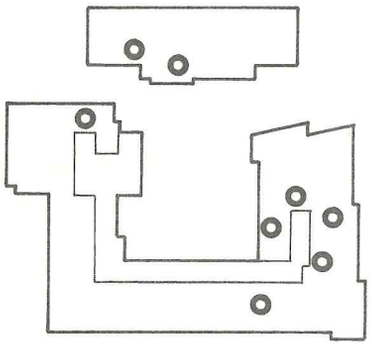
*La Rotonda*

**SUMMARY**

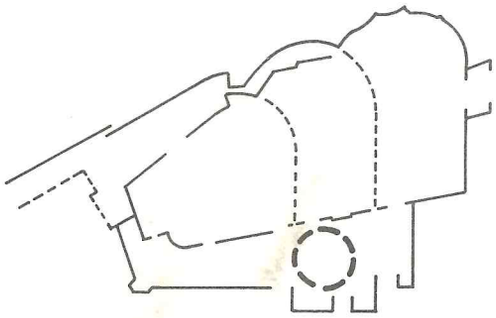
- Incidental.



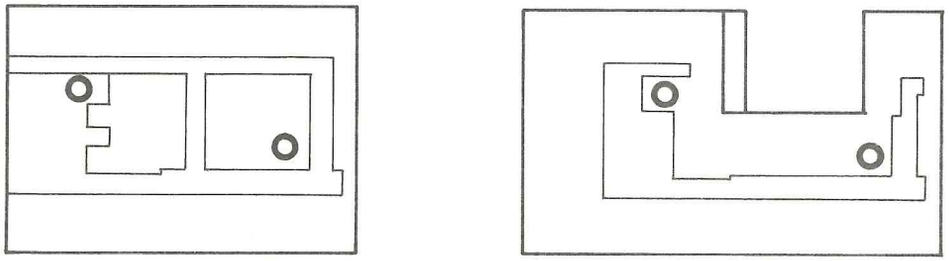
*Cultural Center*



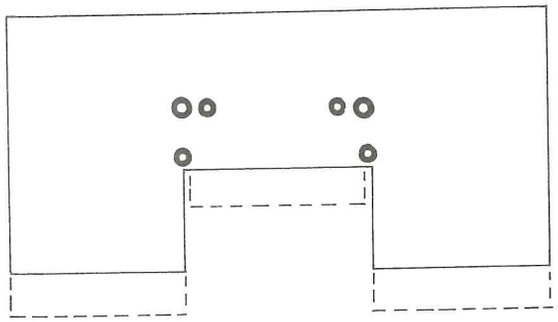
*Town Hall*



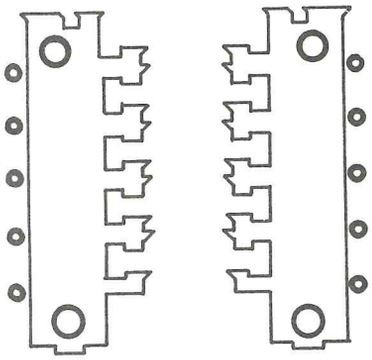
*Imatra Church*



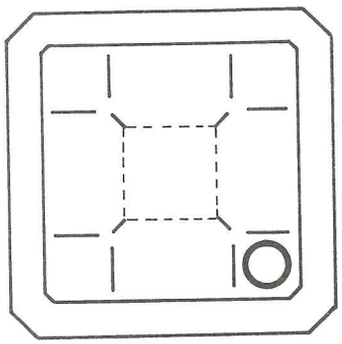
*Enso / Gutzeit*



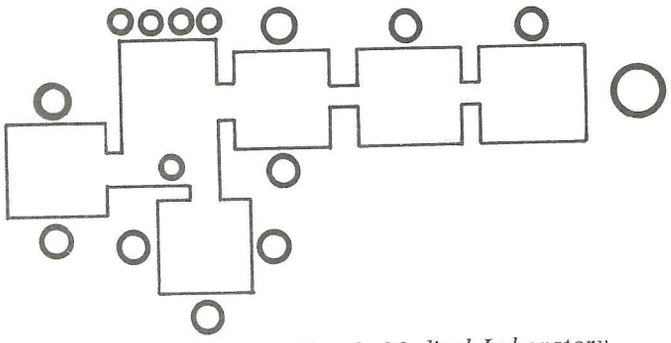
*Kimball Art Center*



*Salk Institute*



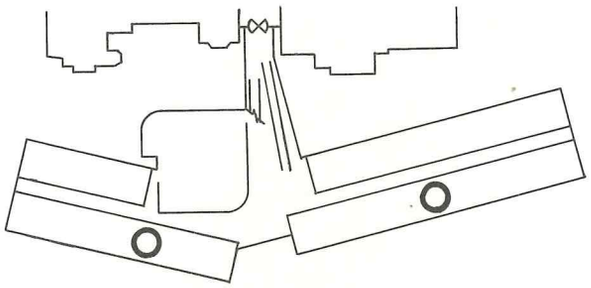
*Exeter Library*



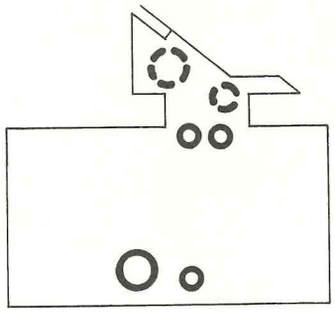
*Richards Medical Laboratory*

**SUMMARY**

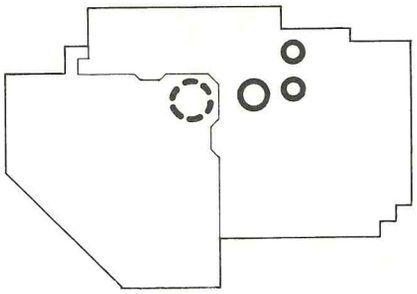
- Often expressed as formal elements.
- Often coincide with structural elemer
- Often treated similarly to verti circulation elements.



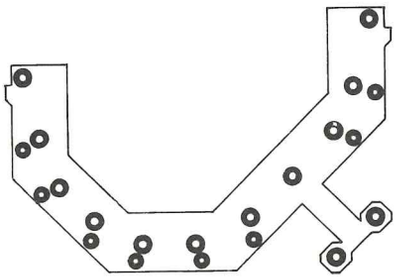
*Olivetti*



*Leicester*



*Cambridge History*



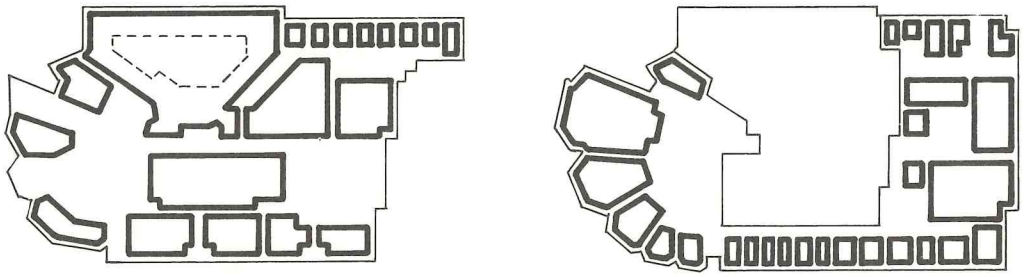
*Oxford Dorm*

**SUMMARY**

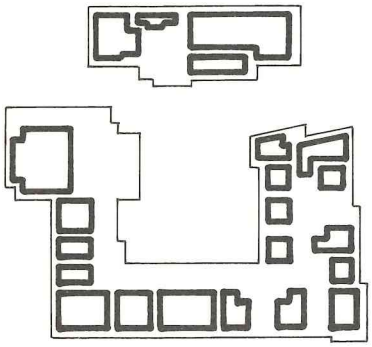
- Often linked in towers with vertical circulation. Otherwise incidental.

**SUMMARY**

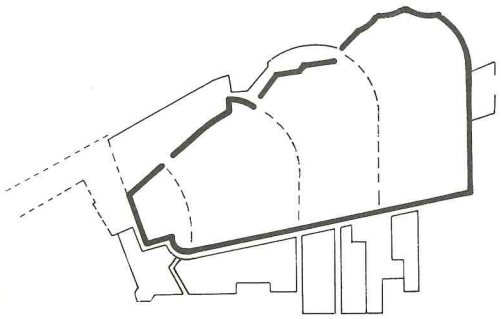
- Major spaces generally contain implied spaces.
- Space definition usually a collection of separate spaces linked to elements of circulation.



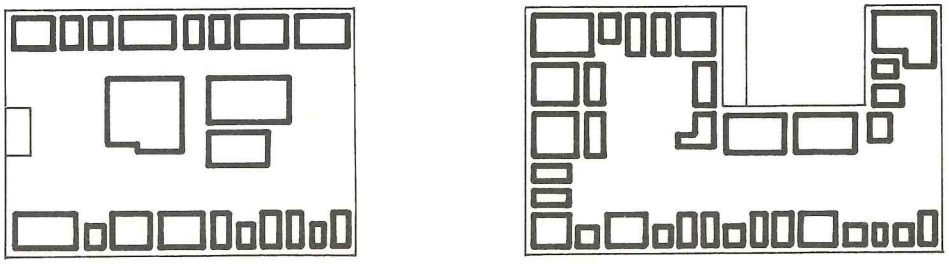
*Cultural Center*



*Town Hall*

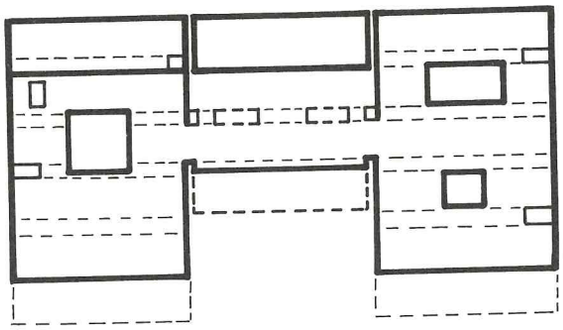


*Imatra Church*

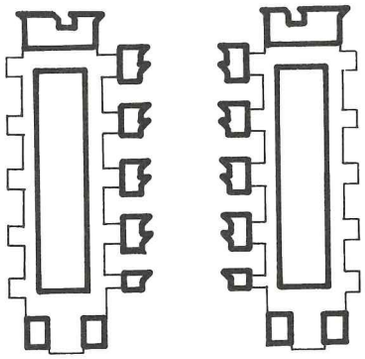


*Enso / Gutzeit*

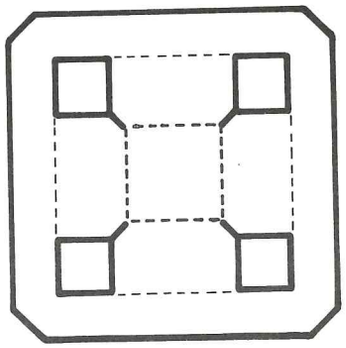
# LOUIS KAHN



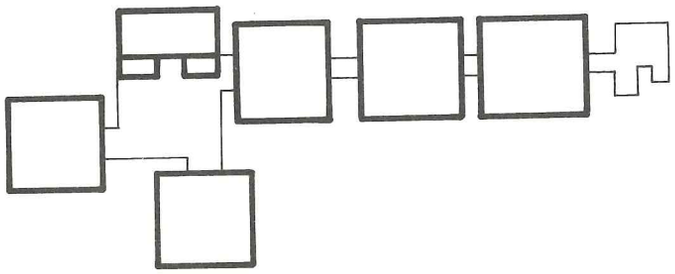
*Kimball Art Center*



*Salk Institute*



*Exeter Library*

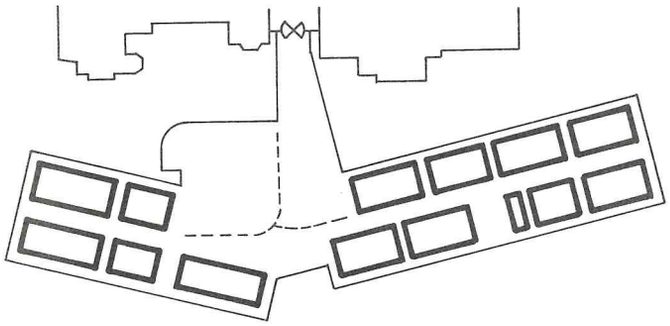


*Richards Medical Laboratory*

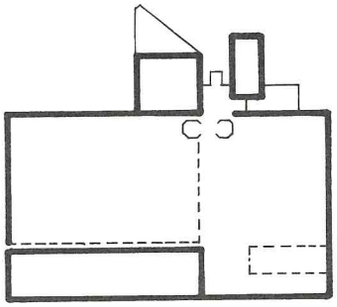
**SUMMARY**

- Major spaces usually contain implied spaces.
- Implied spaces generally formed by structural articulation in roof or ceiling.
- Defined spaces limited by structure.

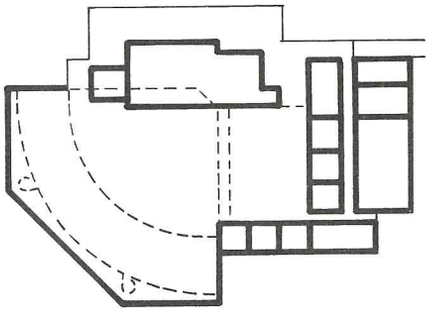
# JAMES STIRLING



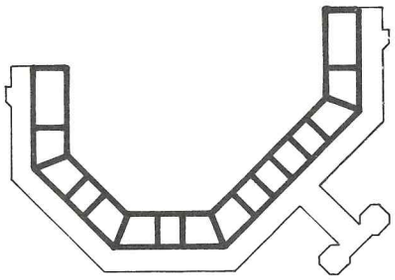
*Olivetti*



*Leicester*



*Cambridge History*

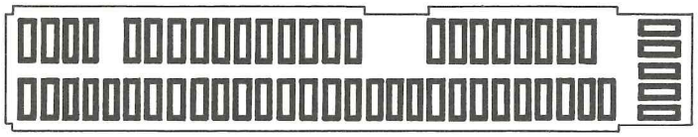


*Oxford Dorm*

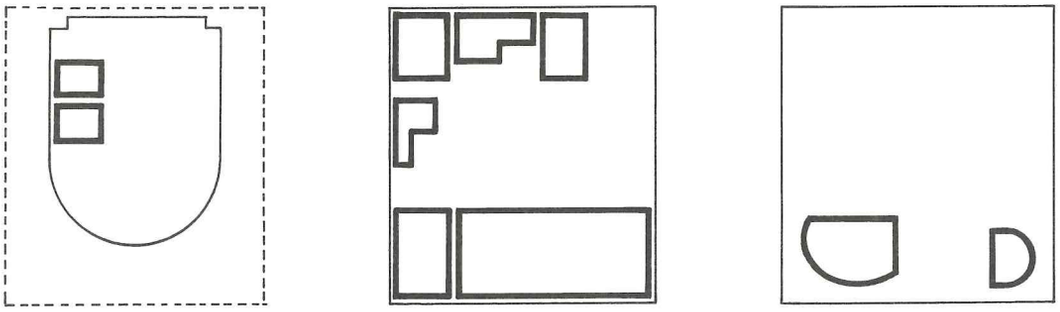
**SUMMARY**

- Spaces generally of three kinds: major unique spaces which tend to be continuous, separate repetitive spaces which usually border unique spaces, and circulation routes which tend to be transparent.

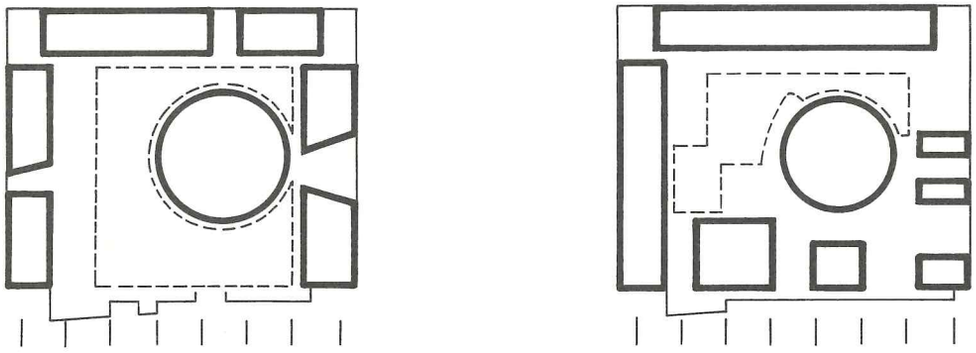
# LE CORBUSIER



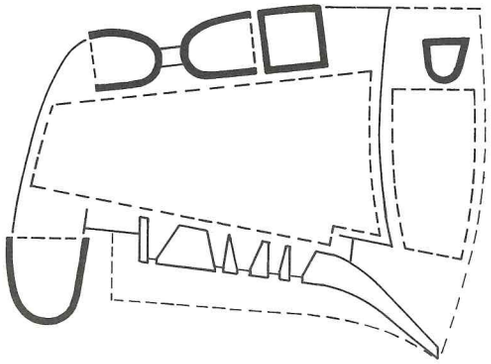
*Marseilles*



*Villa Savoye*



*Assembly at Chandigarh*



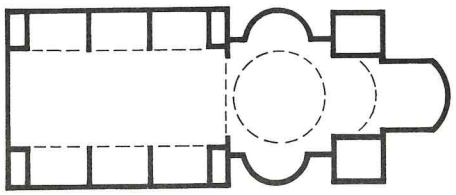
*Ronchamp*

**SUMMARY**

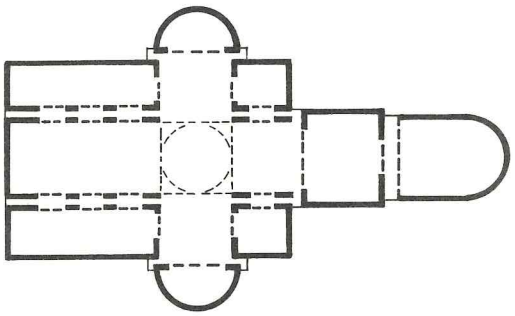
- Both a collection of separate spaces linked by elements of circulation and spaces which contain implied spaces with non-directional circulation.

**SUMMARY**

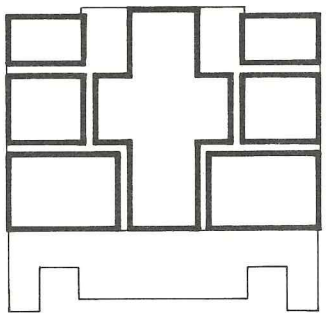
- Varies with building type. Churches are usually large continuous spaces with several implied spaces. Villas are usually a collection of separate spaces located around a major central space.



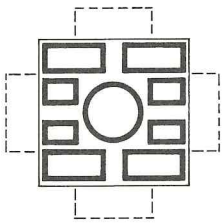
*Redentore*



*San Giorgio*



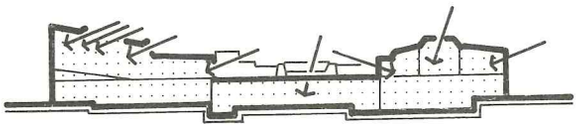
*Malcontenta*



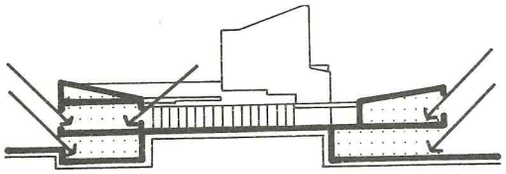
*La Rotonda*

**SUMMARY**

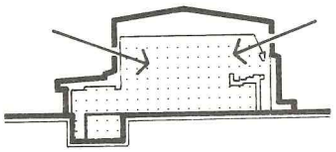
- Brought in from multiple directions, often in complex ways.
- Used to enhance space definition particularly in implied spaces.

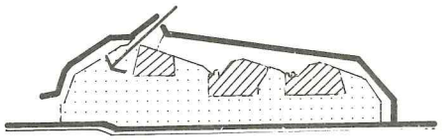


*Cultural Center*

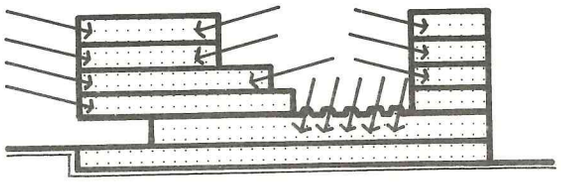


*Town Hall*

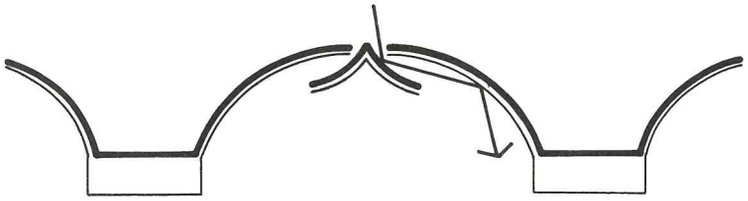




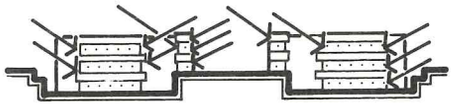
*Imatra Church*



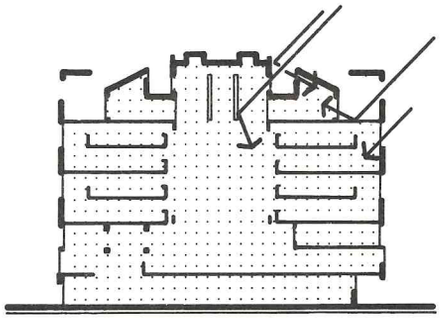
*Enso / Gutzeit*



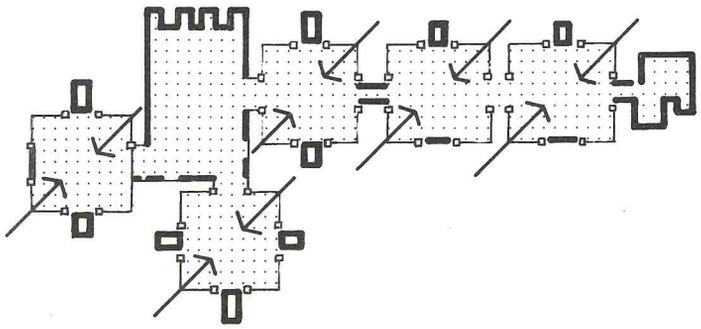
*Kimball Art Center*
*(skylight detail)*



*Salk Institute*



*Exeter Library*

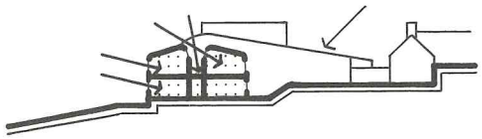


*Richards Medical Laboratory*

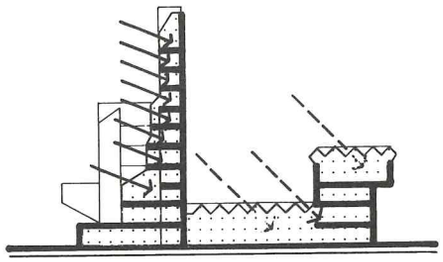
**SUMMARY**

- Usually brought in through wall penetrations.
- When brought in overhead, source is indirect.

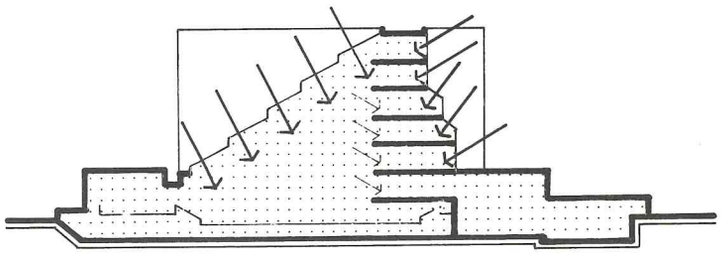
# JAMES STIRLING



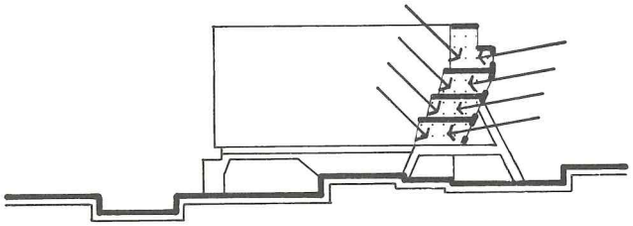
*Olivetti*



*Leicester*



*Cambridge History*

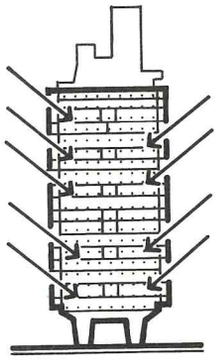


*Oxford Dorm*

**SUMMARY**

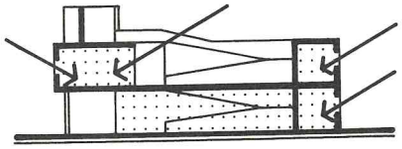
- Glazing treated as total surface therefore light enters building from all directions.
- Integral part of circulation system.
- Light source usually apparent.

# LE CORBUSIER

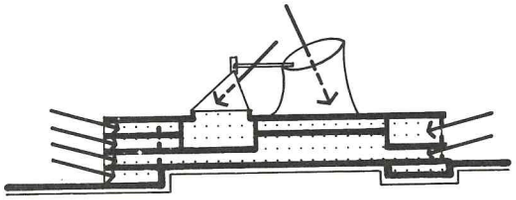


*Marseilles*

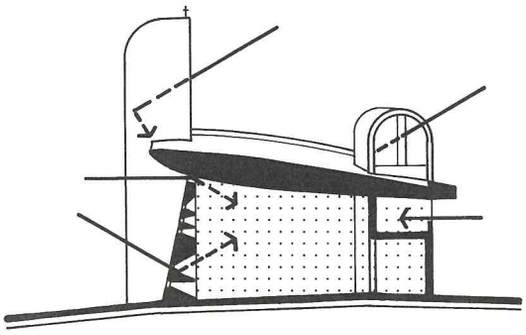
- Often indirect; through sun screens, thick walls, light monitors, etc.



*Villa Savoye*



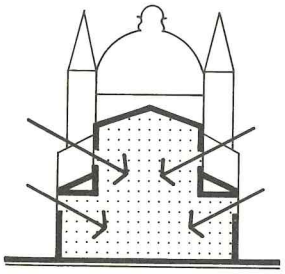
*Assembly at Chandigarh*



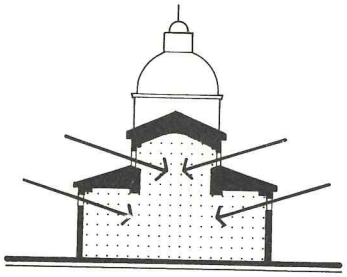
*Ronchamp*

**SUMMARY**

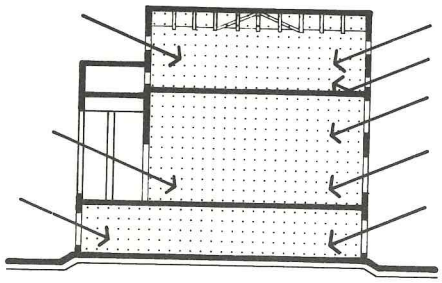
- Generally through wall penetrations. Many times located in upper portions of space.



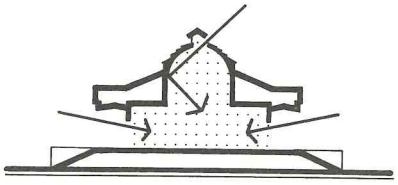
*Redentore*



*San Giorgio*



*Malcontenta*



*La Rotonda*

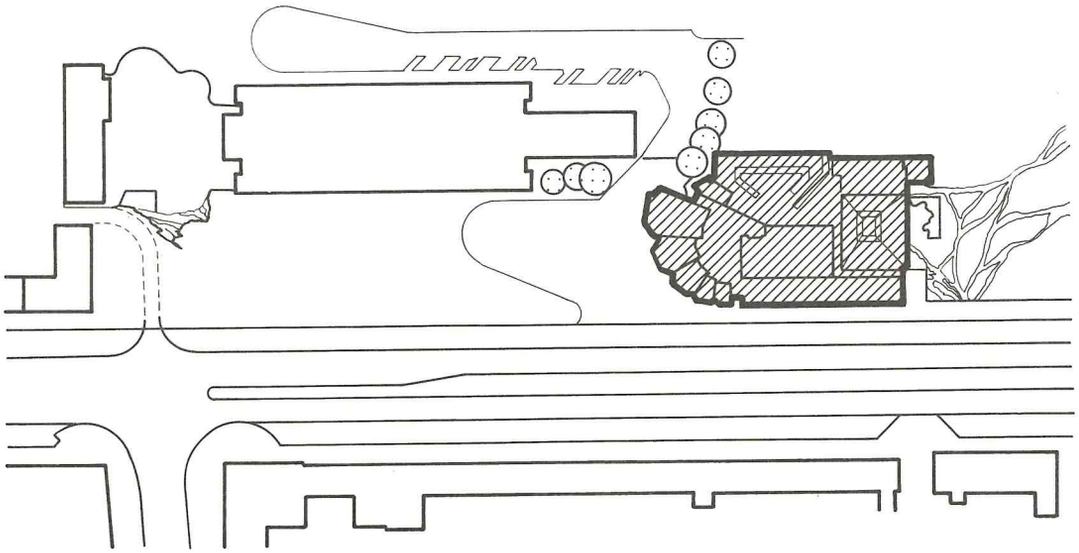
# RELATIONSHIPS

## BUILDING TO CONTEXT

The examination of the primary relationships between a building and its immediate proximity; focusing on site specific information of access, boundary conditions, topography, views, and vegetation. Another focus is contextual issues which may have influenced the design; such as, adjacent activities patterns, form languages, and geometries.

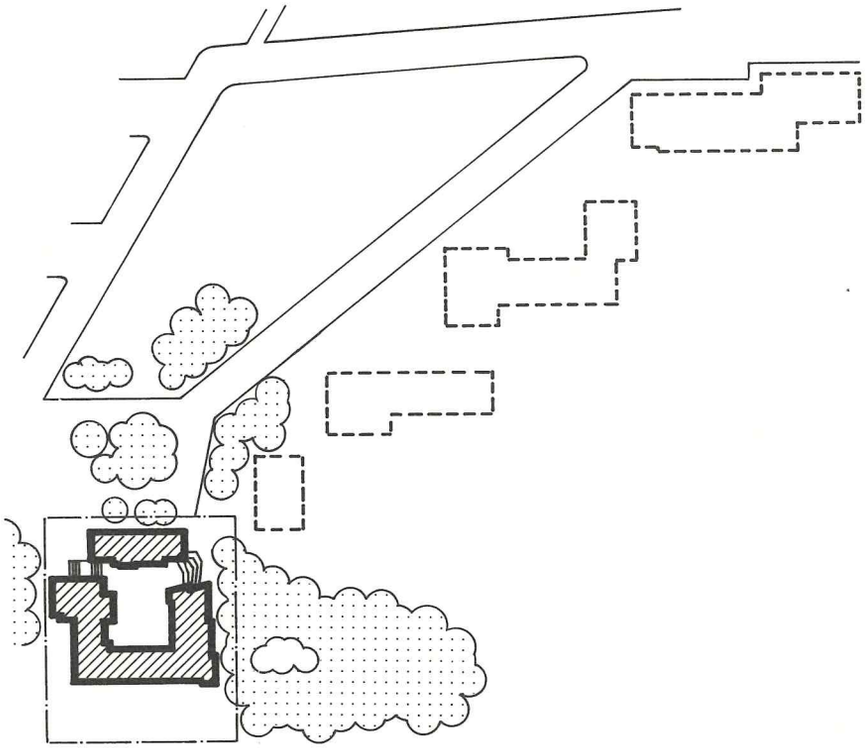
***Cultural Center***

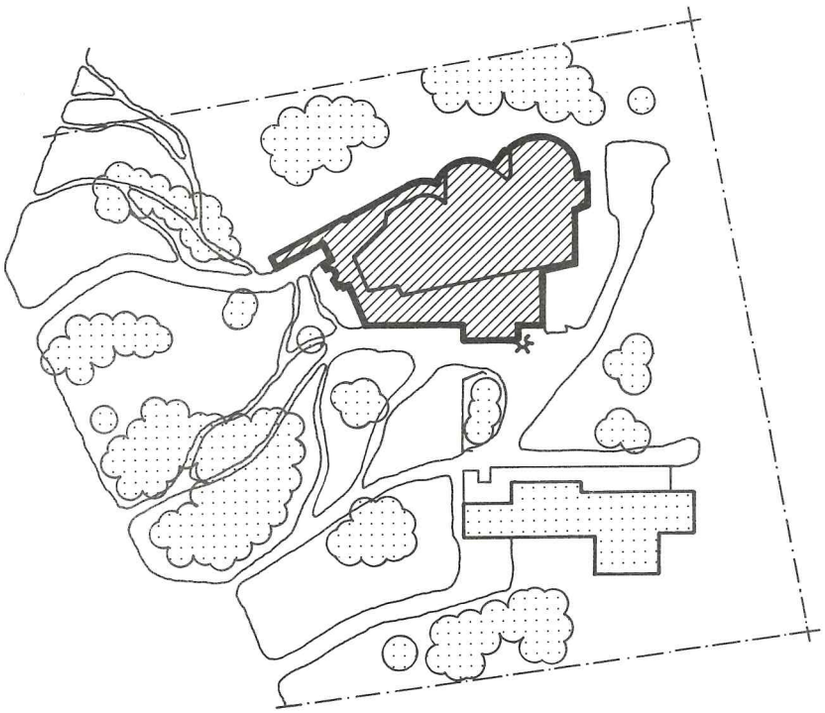
- Building located to side of town hall plaza.
- Building edge adjacent to plaza steps back from street toward town hall.
- Other edges of building orthogonal to street and surrounding building pattern.



***Town Hall***

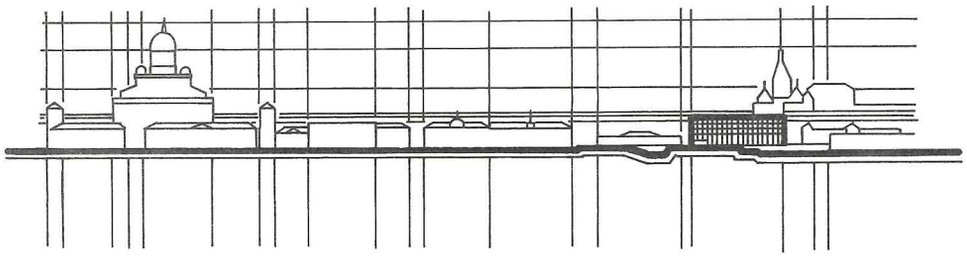
- Central courtyard raised on fill above surrounding landscape.
- Wooded site.
- Council chamber is dominant built form.





*Imatra*

- On wooded site in loosely scattered industrial area.
- Church dominates site and bell tower dominates surrounding landscape.
- Orthogonal side of church oriented toward other orthogonal building on site.
- Bell tower designed to be distinct from surrounding industry smoke stacks.

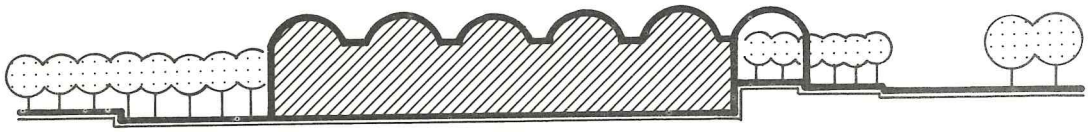


*Enso/Gutzeit*

- Orthogonal building configuration consistent with city grid.
- Building height sympathetic to similar buildings and subordinate to major buildings.
- Grid of building skin reflects grid of city.

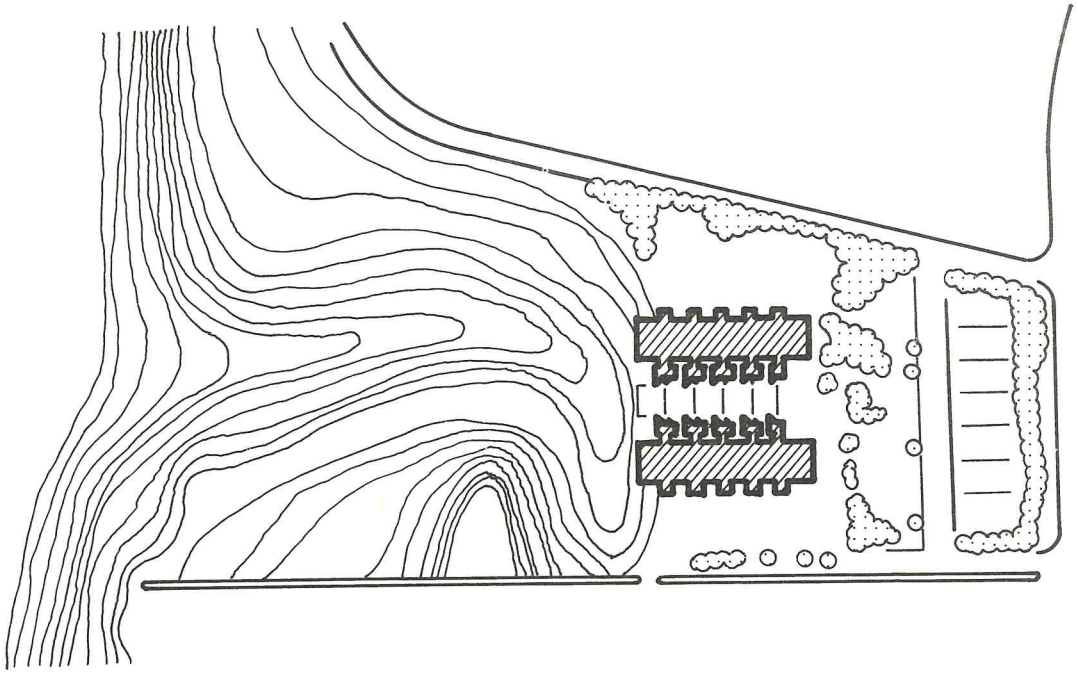
*Kimball Art Center*

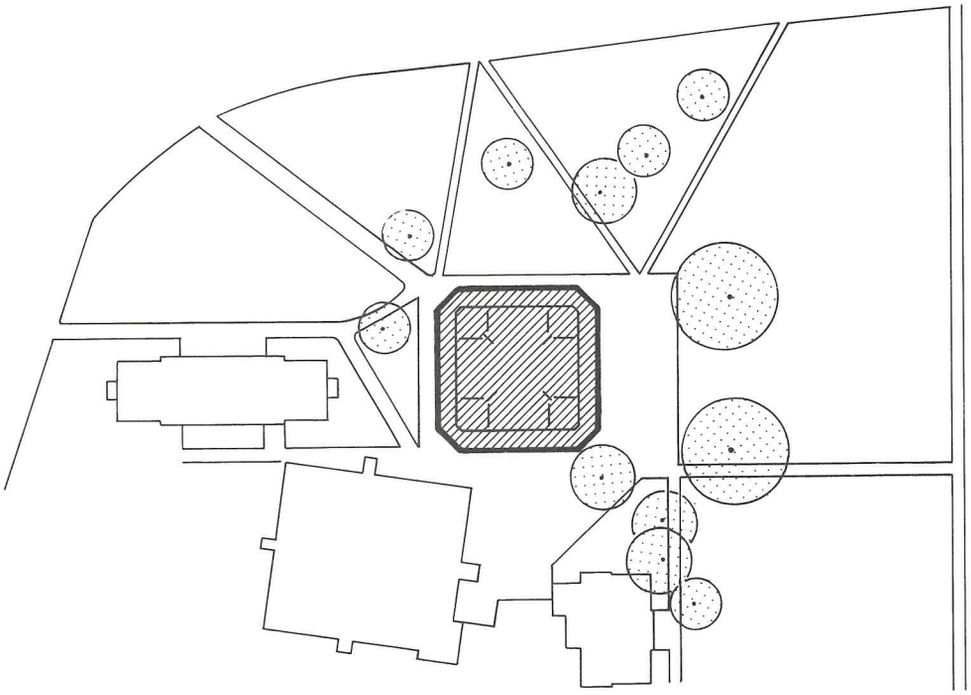
- Located in park.
- Silhouette of building derived from surrounding landscape.



*Salk Institute*

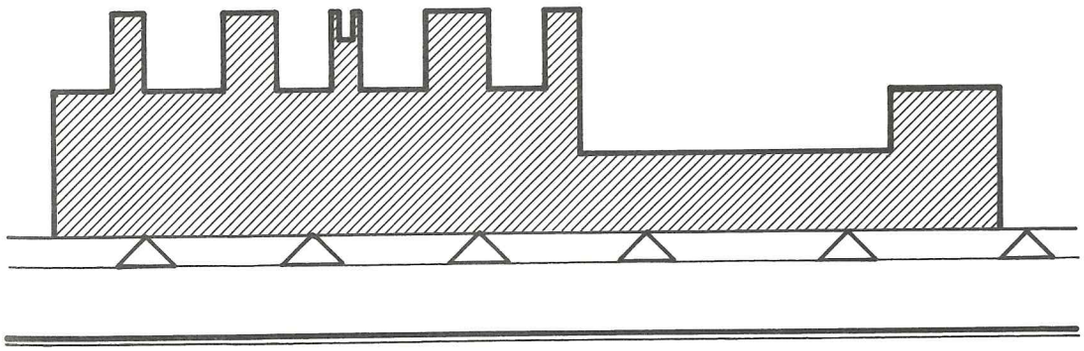
- On a generous site at cliff edge, overlooking ocean, as part of proposed larger complex.
- Entrance court between buildings opens to ocean.





*Exeter Library*

- On rural campus of predominately Georgian buildings.
- Fronts on major street with lawn between building and street.
- On axis with dominant campus building across the street.
- Building is orthogonal to existing Georgian buildings.

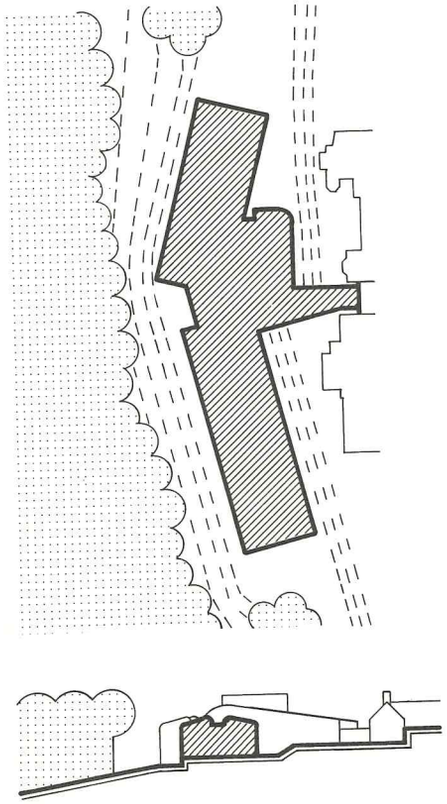


*Richards Medical Laboratory*

- On urban university campus.
- Variation in silhouette, though in a different form language, is similar to silhouette of adjacent buildings.

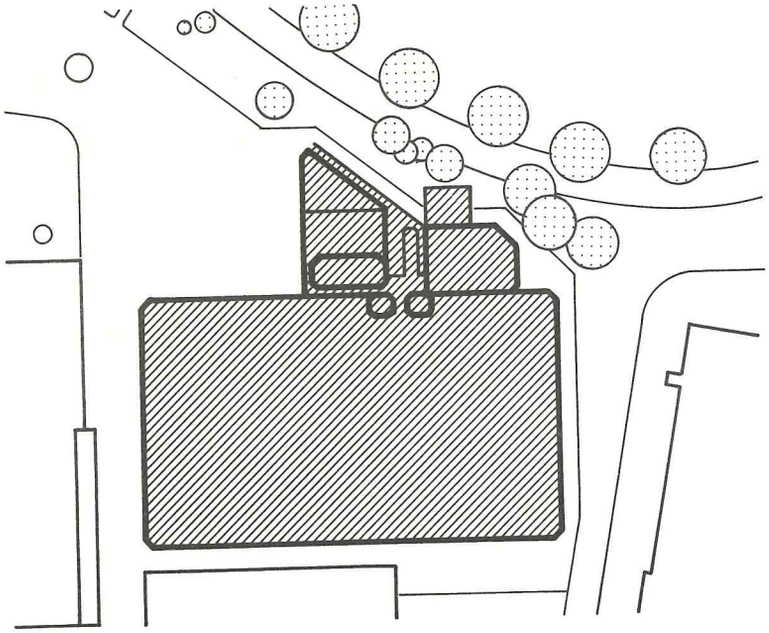
***Olivetti***

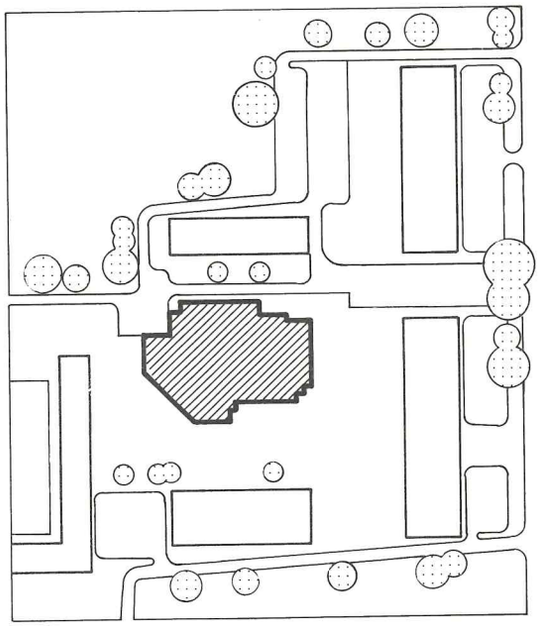
- An addition to an existing building.
- Sited in clearing between existing building and bank of trees.
- Axis of building parallel to site contours.



***Leicester***

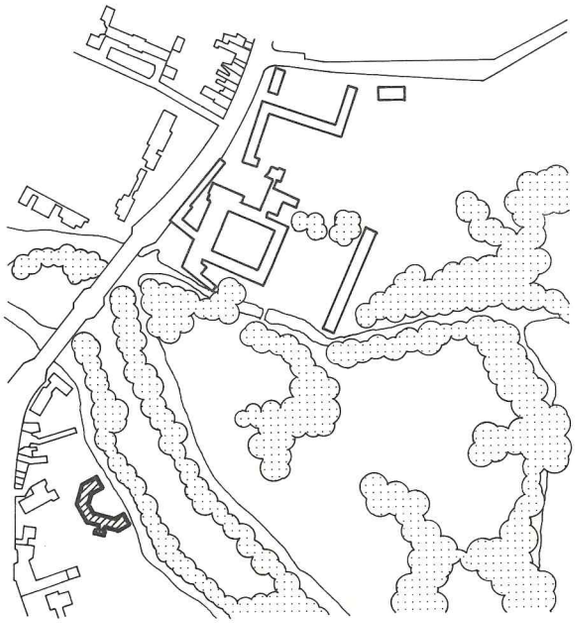
- On university campus in predominately industrial city.
- Site bounded on three sides by buildings.





***Cambridge History***

- On university campus.
- Building orthogonal to adjacent campus buildings which form a quadrangle.

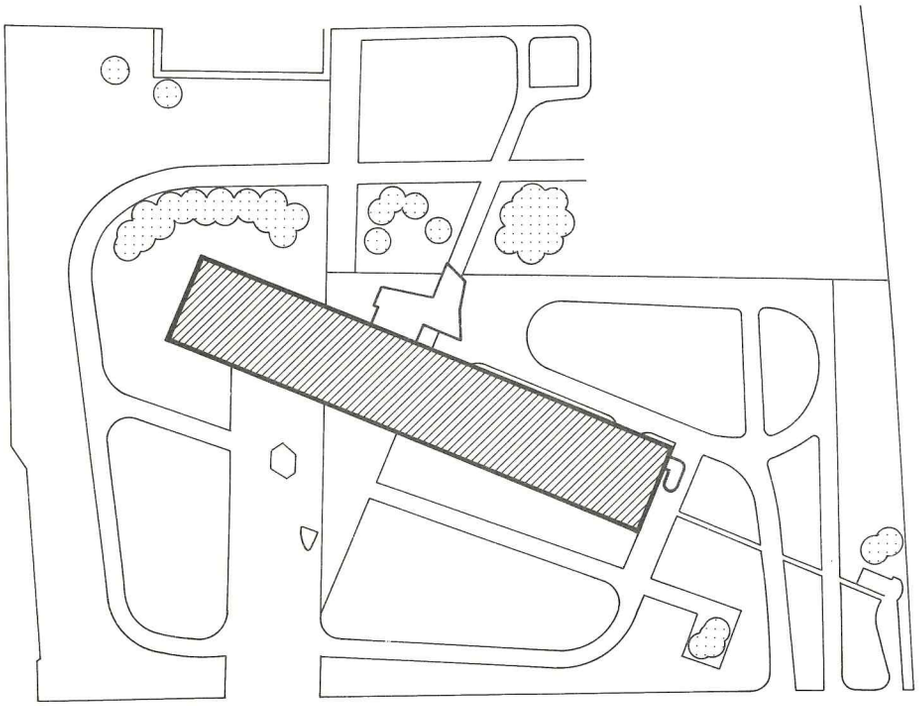


***Oxford Dorm***

- On university campus that is dominated by gothic buildings organized around courtyards.
- Open side of complex sited toward river and major quadrangle of university.
- Open side of complex completed by trees to form a courtyard.

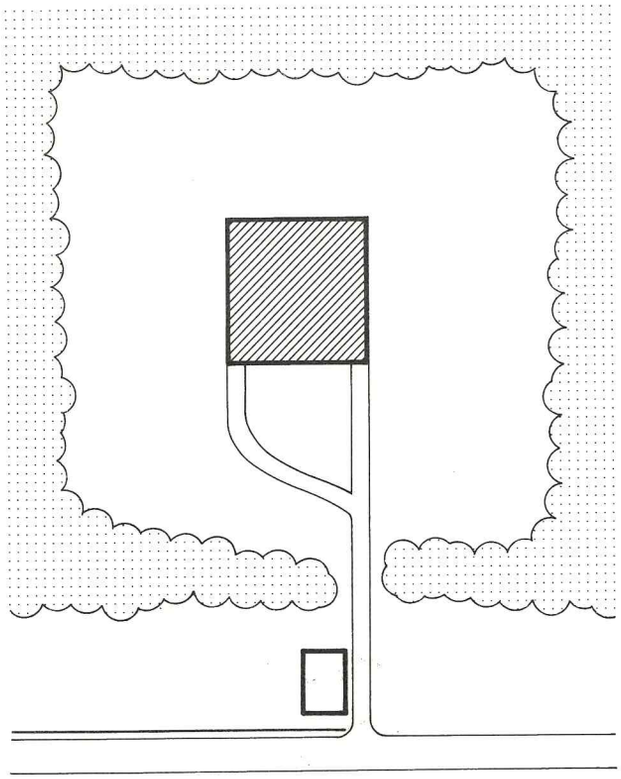
***Marseilles***

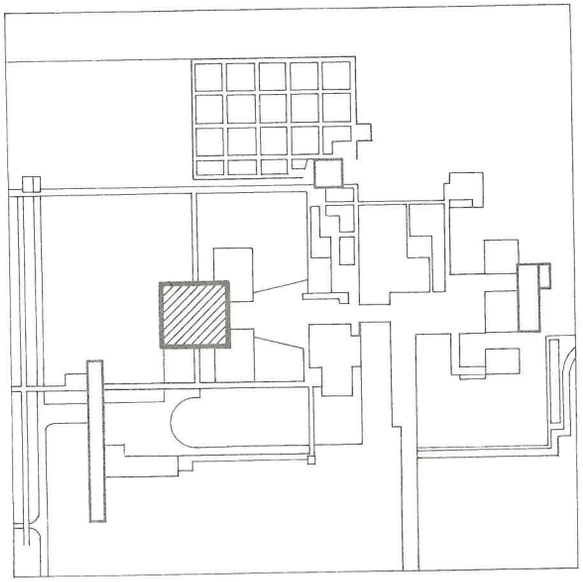
- Building located on open suburban site in a natural, meadow-like area.



***Villa Savoye***

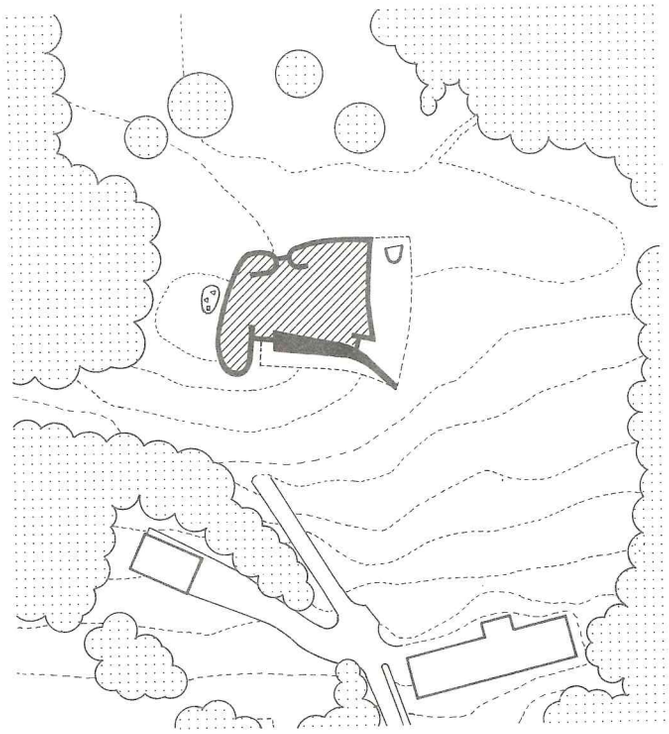
- Building located in open pasture encircled by trees with existing country road left intact to form part of entry drive which continues under house.





*Assembly at Chandigarh*

- Center of main capital complex—located between secretariat and palace of justice.

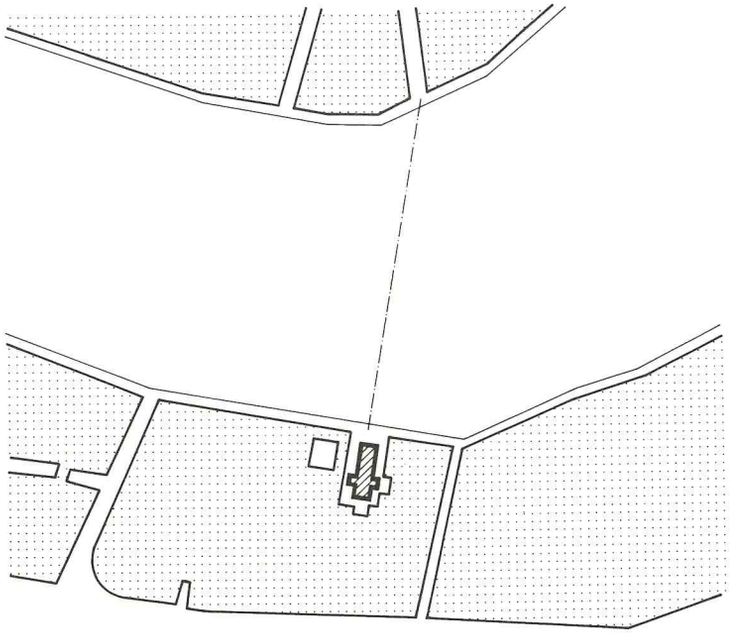


*Ronchamp*

- On crest of hill that dominates the region.

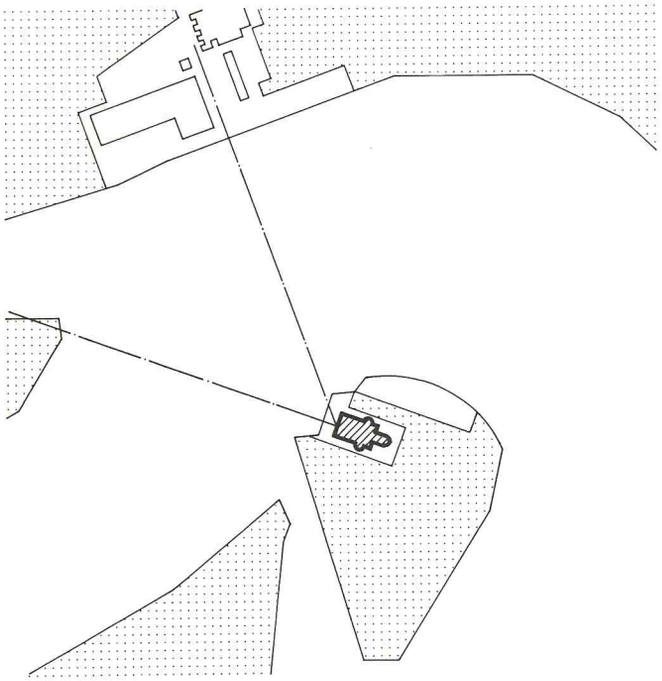
***Redentore***

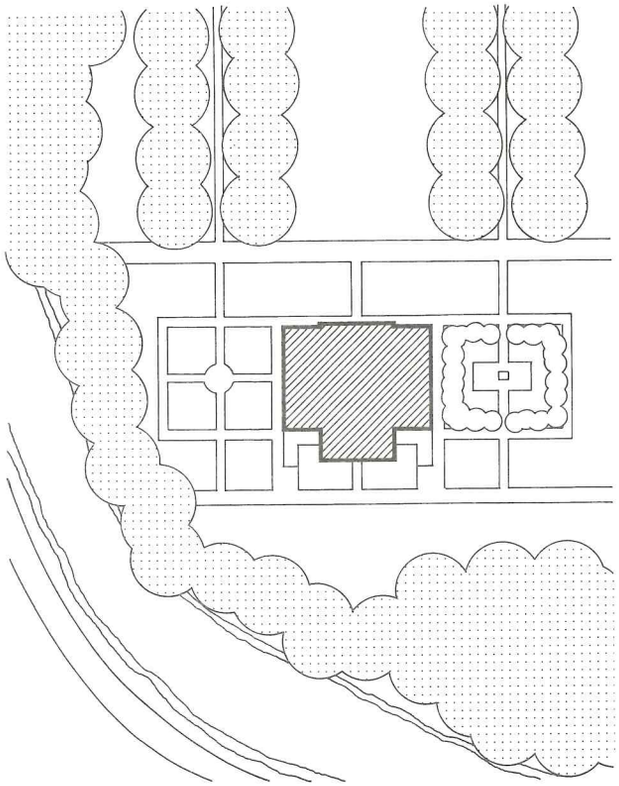
- In dense fabric oriented toward canal.
- Serves as terminus for religious procession that originates across canal.



***San Giorgio***

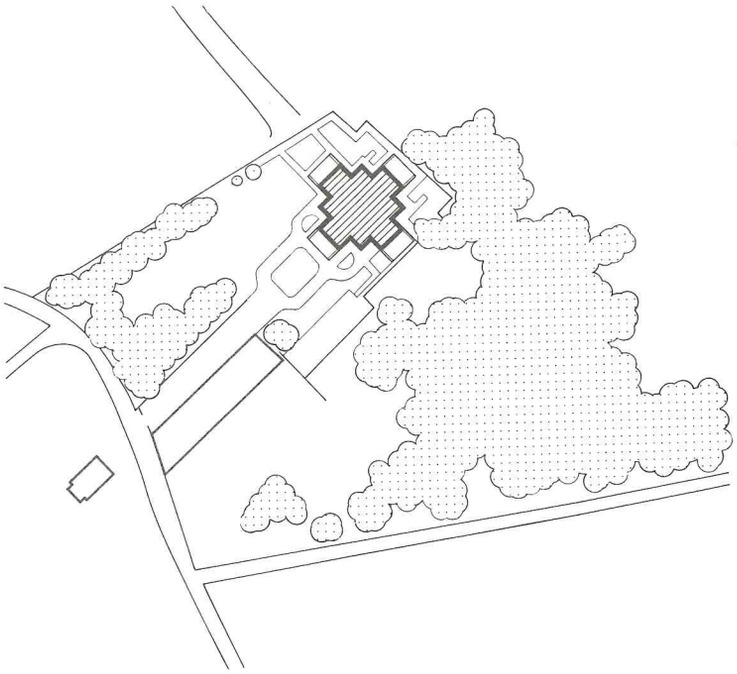
- Dominant form on island opposite major urban open space.





***Malcontenta***

- Located on canal in rural landscape.



***La Rotonda***

- Located on top of knoll above surrounding landscape.
- Built on one story platform.

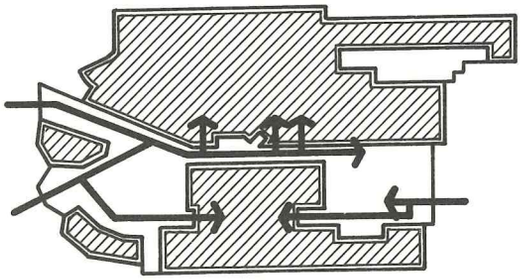
# RELATIONSHIPS

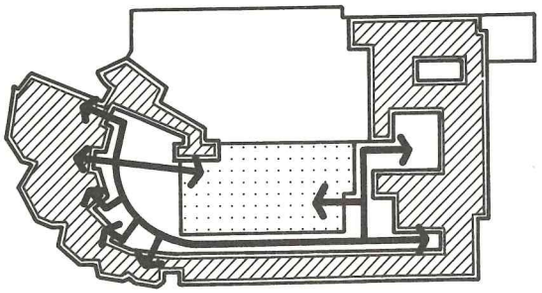
## CIRCULATION TO USE

The examination of the relationship between static and dynamic activities. As such, it is the combination of the circulation and space definition diagrams. The basic relationships are that circulation is separate from use space or through the use space. If circulation is separate from use space it either defines, serves, or links the use spaces. Circulation through a use space can be either defined or implied.

***Cultural Center***

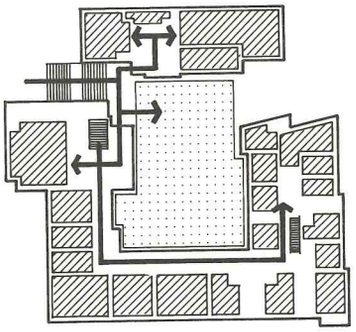
- Circulation separate from use spaces.
- Use spaces around perimeter; circulation internal on first floor, adjacent to open court on second floor.
- Enter lobby space on each floor, then distribute.





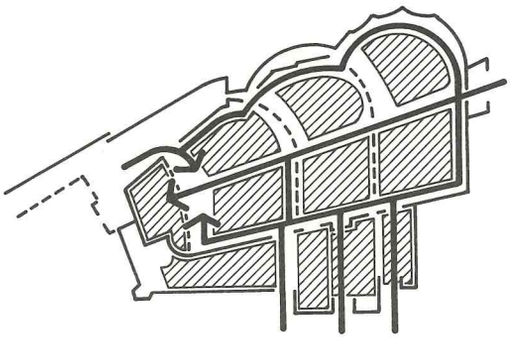
***Town Hall***

- Circulation separate from use spaces.
- Enter through central court into lobby spaces.
- Use spaces around perimeter, circulation adjacent to open court.



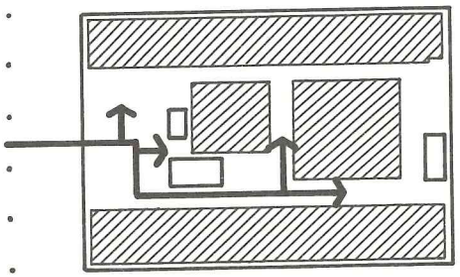
***Imatra***

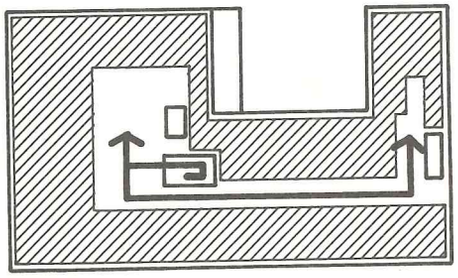
- Ceremonial circulation along central aisle through use space.
- General circulation filters through side into major space.



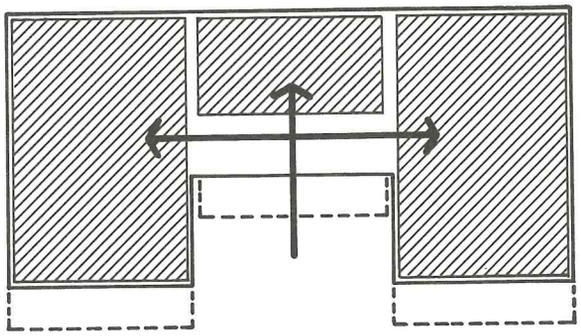
***Enso/Gutzeit***

- Circulation separate from use spaces.
- Use spaces around perimeter, circulation internal.
- Enter lobby space on each floor then distribute.



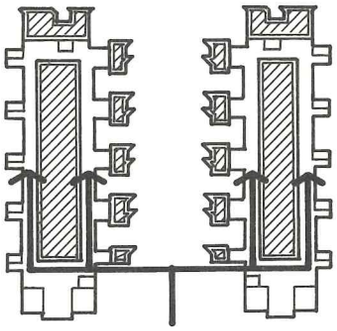


# LOUIS KAHN



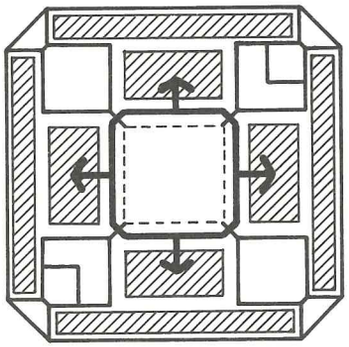
***Kimball Art Center***

- Circulation through use major spaces.
- Vertical circulation incidental.



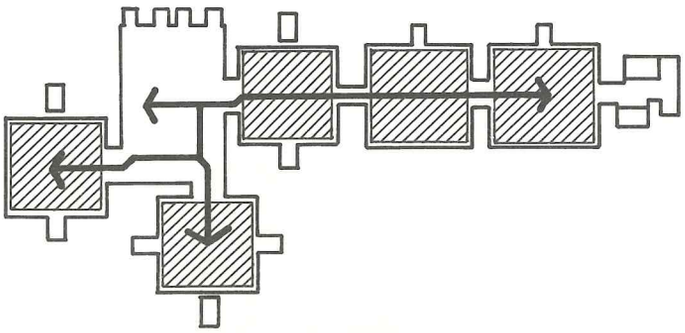
***Salk Institute***

- Circulation separate from and generally outside of enclosed spaces.
- Vertical circulation generally in clearly articulated towers.



***Exeter Library***

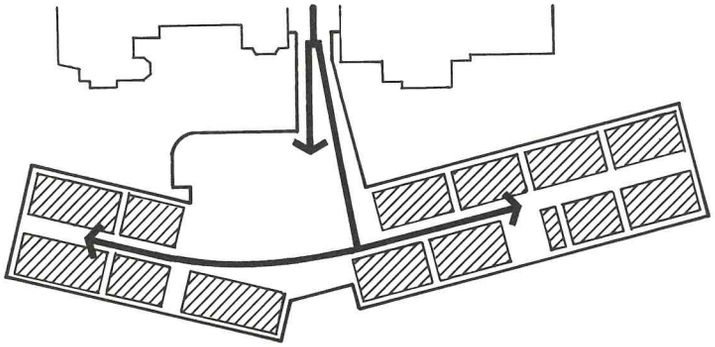
- Circulation through major use spaces and around central well.
- Vertical and horizontal circulation patterns reinforce formal organization of building.



***Richards Medical Laboratory***

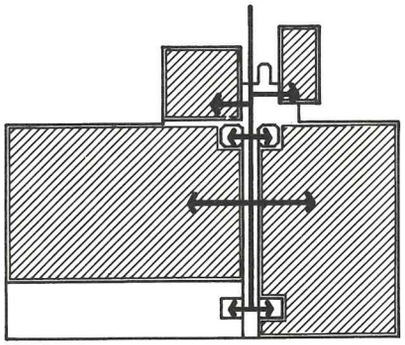
- Circulation through major use spaces, that are separated by a series of circulation links.
- Vertical circulation generally located on exterior of buildings in clearly articulated towers.

# JAMES STIRLING



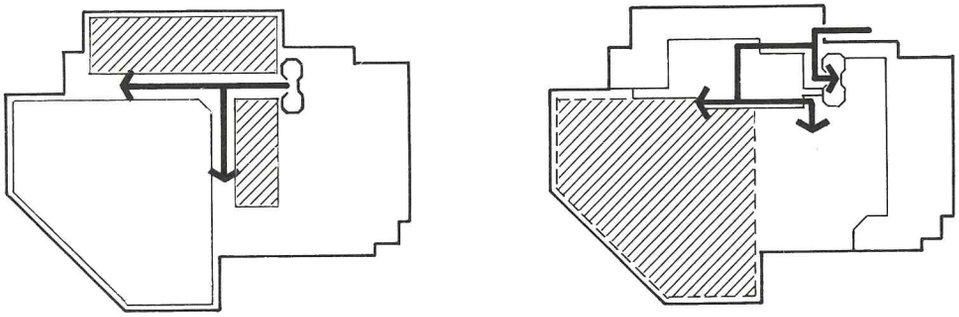
***Olivetti***

- Circulation separate from use space.
- Circulation used as link to existing building and enclosed in glass.



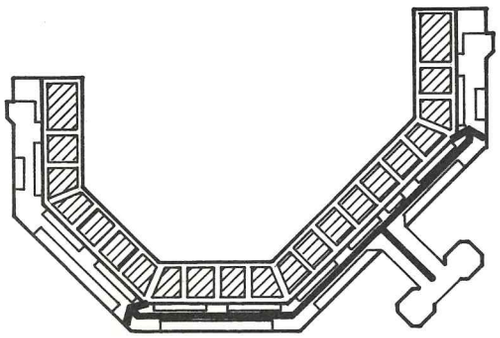
***Leicester***

- Circulation separate from use spaces and generally glass enclosed.
- Vertical circulation located in clearly articulated towers.



***Cambridge History***

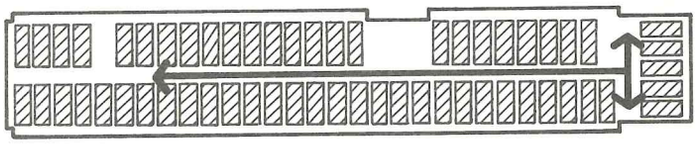
- Circulation generally separate from use spaces with the exception of the major use space.
- Defined circulation usually enclosed by glass.
- Vertical circulation located in clearly articulated towers.



***Oxford Dorm***

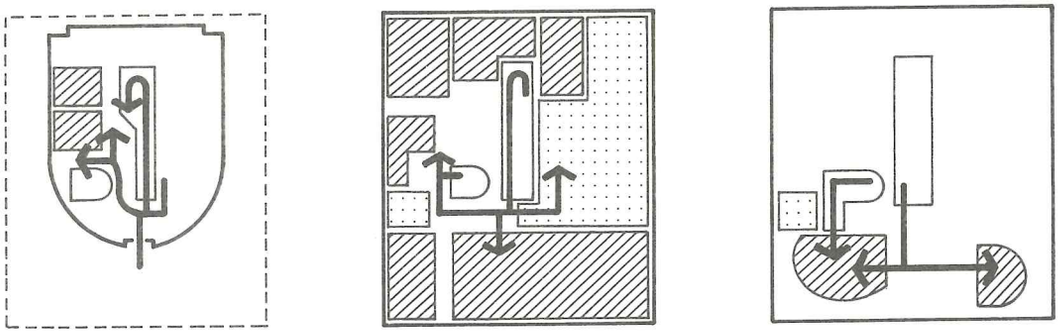
- Circulation separate from use spaces.
- Vertical circulation located in clearly articulated towers.
- Circulation generally at perimeter, with use spaces adjacent to court.

# LE CORBUSIER



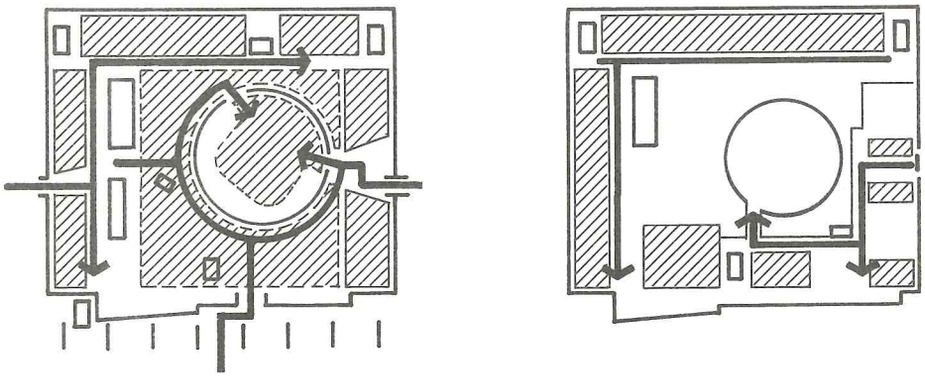
***Marseilles***

- Circulation located on every third floor is separate from and outside of enclosed spaces.



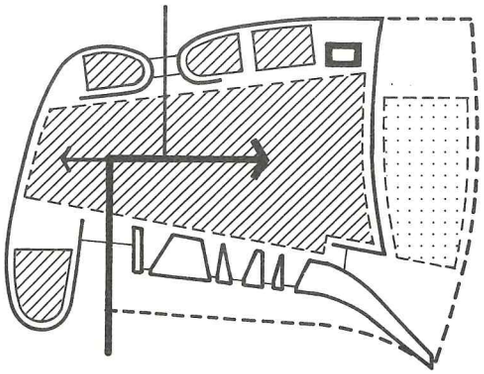
***Villa Savoye***

- Use spaces organized about central ramp which is dominant circulation element.



***Assembly at Chandigarh***

- Two general circulation patterns; one is separate from and outside enclosed spaces, other is through major use spaces.

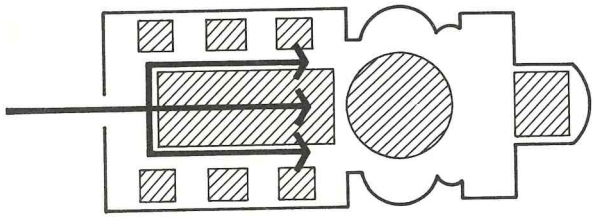


***Ronchamp***

- Circulation through major use space.

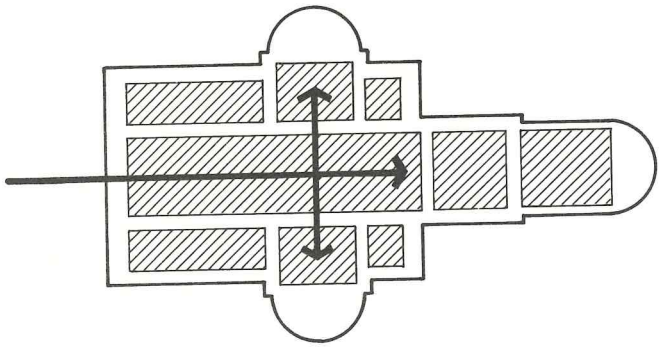
***Redentore***

- Circulation through major use spaces.



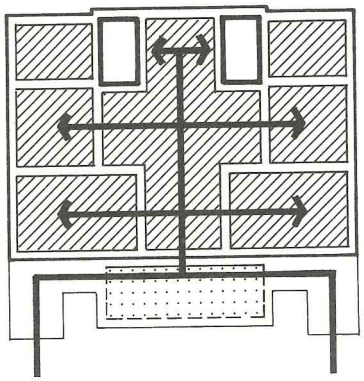
***San Giorgio***

- Circulation through major use spaces.



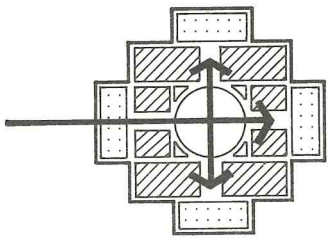
***Malcontenta***

- Circulation through major use spaces.



***La Rotonda***

- Circulation through major use spaces.
- Vertical circulation located off major central space.



# RELATIONSHIPS

## PLAN TO SECTION

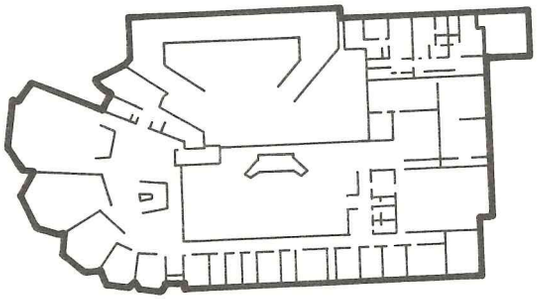
The examination of the relationship between two dimensional information as represented in a plan and the third dimension represented in section or elevation.

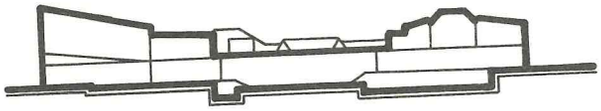
There is either a direct or indirect relationship between the plan and the section. Direct relationships exist when the section is the plan rotated 90°, similar articulations occur in plan and section, or the plan is the inverse of the section.

Indirect relationships exist when the plan and section are articulated independently; such that information from one does not suggest the configuration of the other.

***Cultural Center***

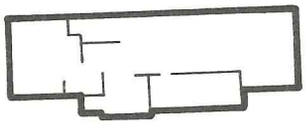
- Major use spaces articulated in section.
- Complex plan forms are expressed in section as simpler configurations, and conversely simple plan forms are expressed in section as more complex configurations.

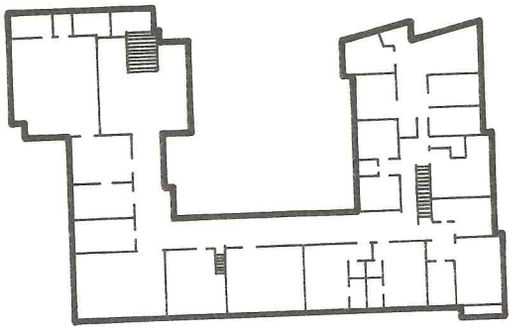


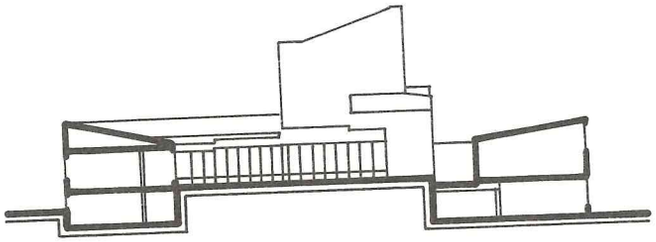


***Town Hall***

- Major space dominates section.
- Courtyard is negative form in section and plan; major space is positive form in section only.







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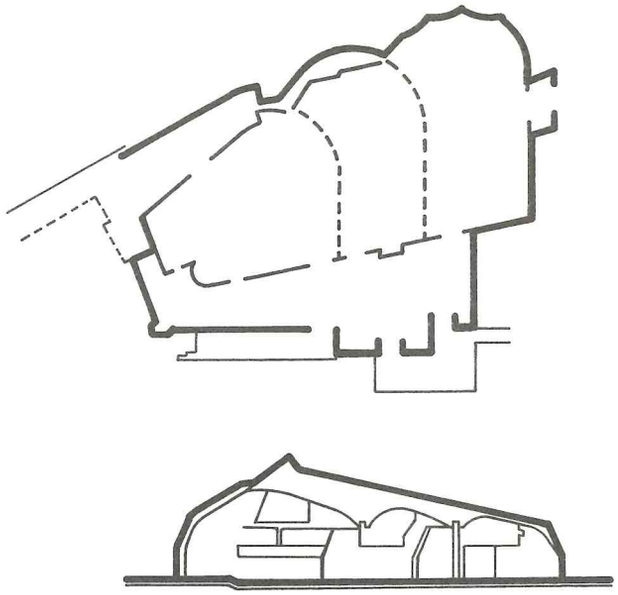
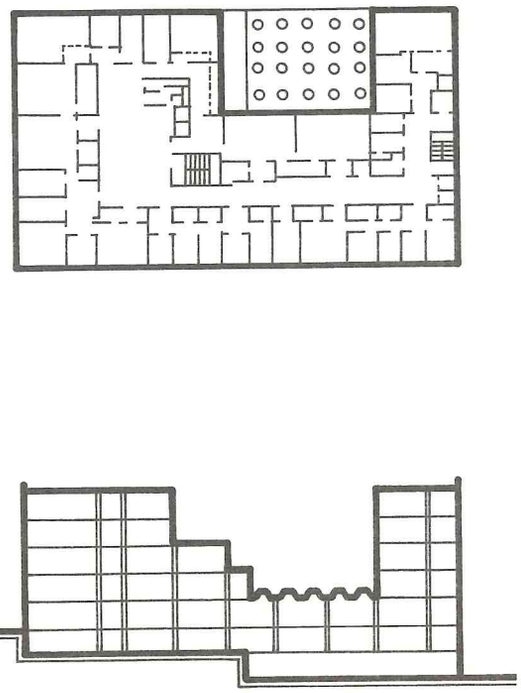


*Imatra*

- Strong formal similarity between exterior plan form and interior section form of major space.
- As plan form decreases, section increases.

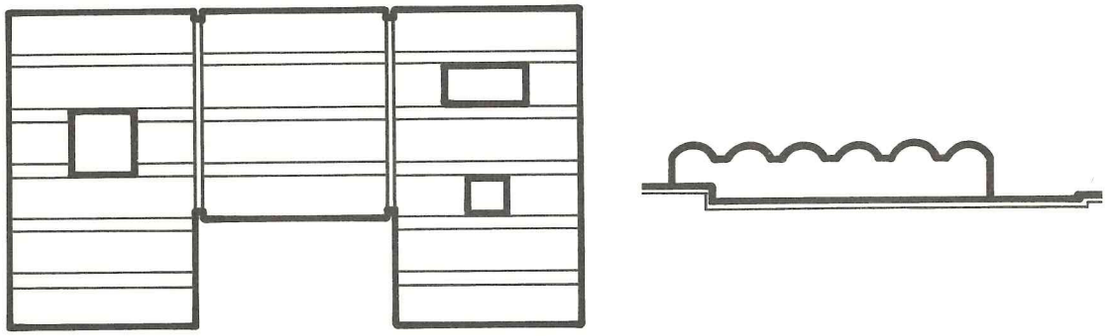


*Enso/Gutzeit*

- Strong formal similarity between plan and section.

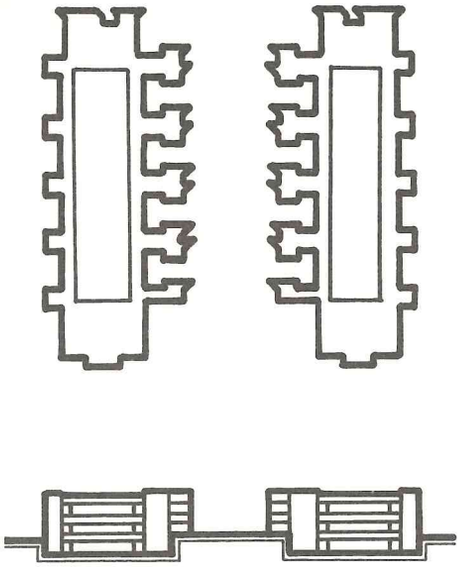
***Kimball Art Center***

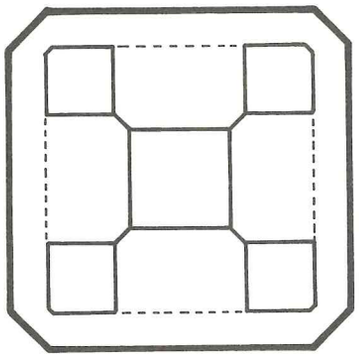
- Articulation of plan form independent of section articulation.
- Variation in use spaces not articulated in plan or section.

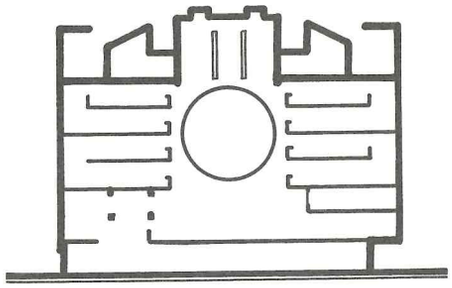


***Salk Institute***

- A plan form more articulated than, and generally independent from, section articulation.

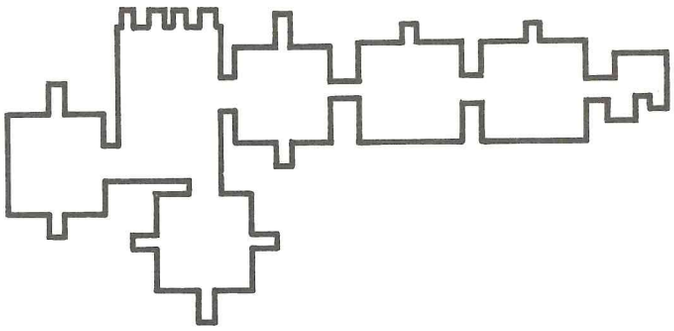


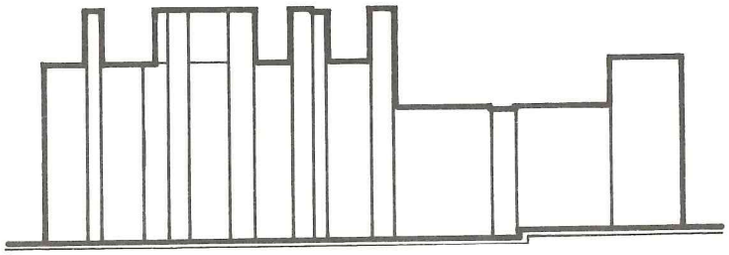




***Exeter Library***

- Strong formal similarity between plan and section. Both developed from 9-square configurations where the center cell in both plan and section is void.



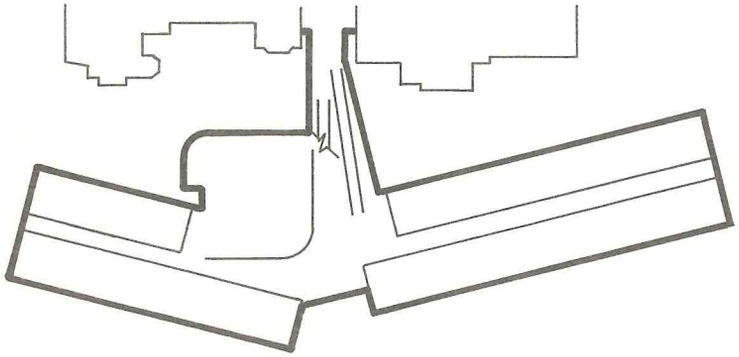


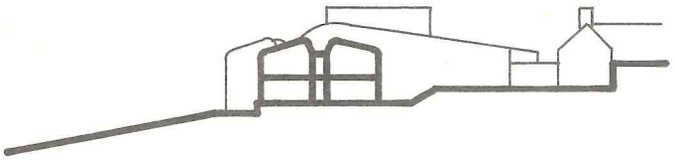
***Richards Medical Laboratory***

- Formal elements articulated in both plan and section.

*Olivetti*

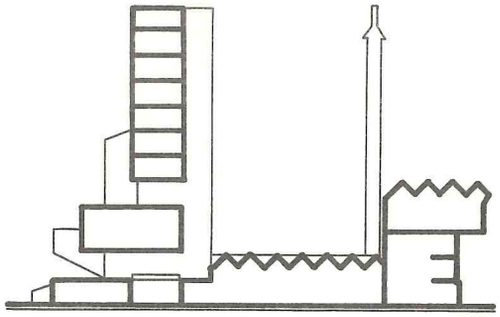
- Major building elements articulated as parts in plan and section.

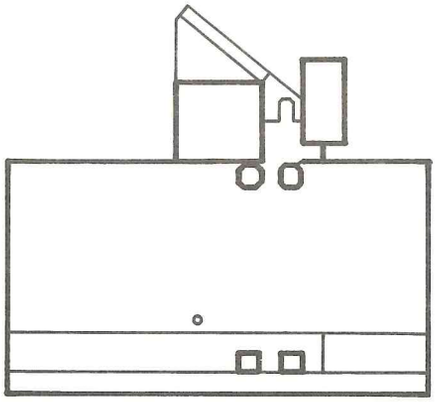


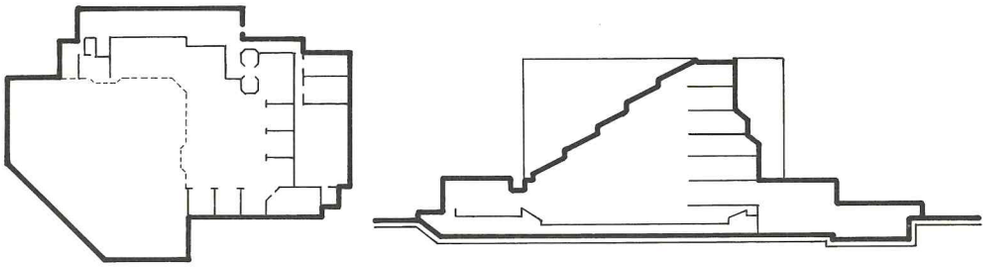


*Leicester*

- Inverse relationship exists between plan and section. Large plan form is lowest form in section and smallest plan form is tallest form in section.
- Section is more complex than plan.

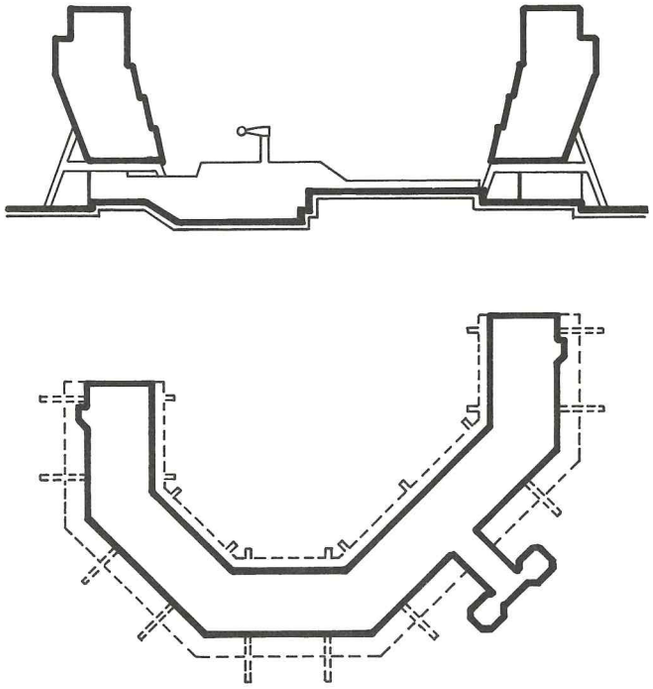






*Cambridge History*

- Strong formal similarity between plan and section at major use space, expressed as dominant angular form.

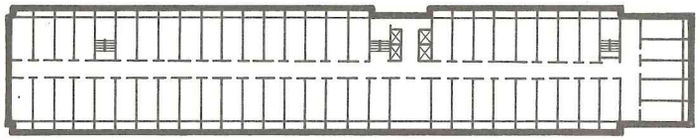


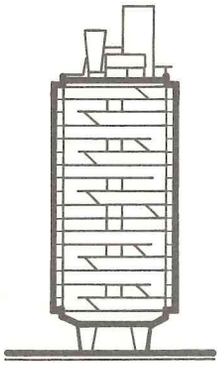
*Oxford Dorm*

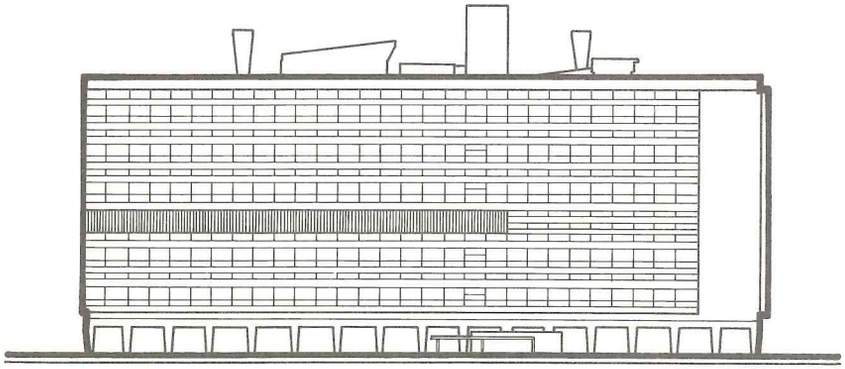
- Strong formal similarity between plan and section; both are 'u' shaped configurations.
- Open side of complex completed by trees to form a courtyard.

*Marseilles*

- Similar articulation in plan, section and elevation.

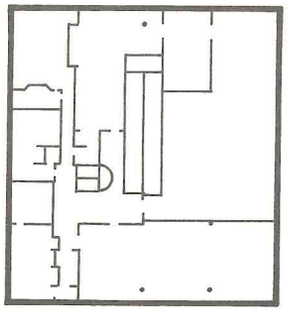


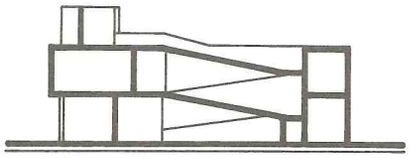


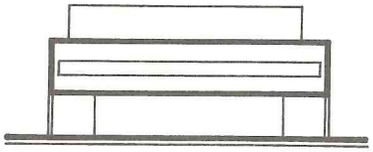


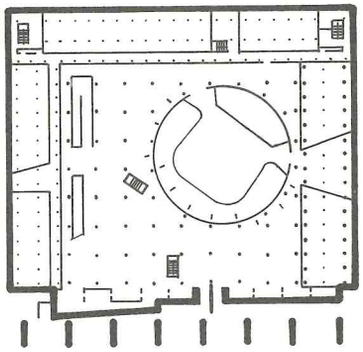
*Villa Savoye*

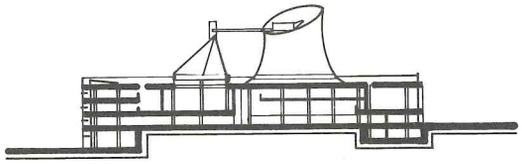
- Plan and section developed from similiar simple geometric forms.





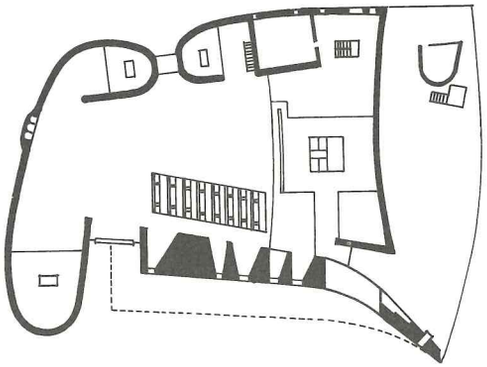


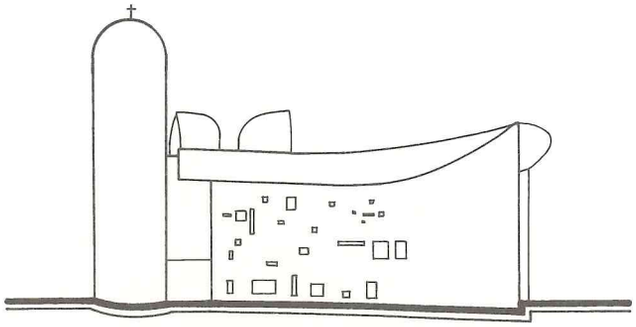




***Assembly at Chandigarh***

- Unique formal elements are articulated in plan and section.



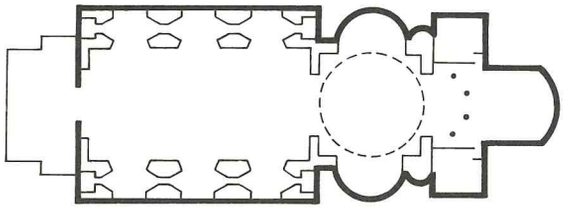


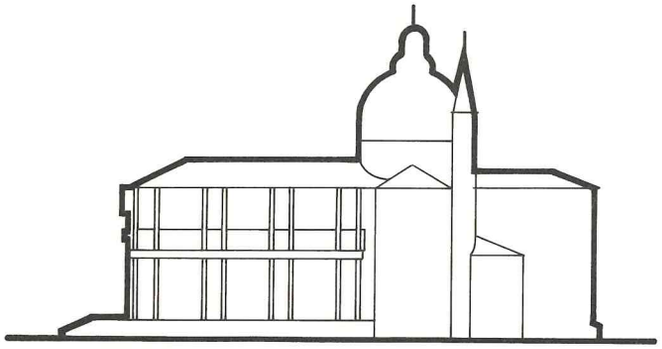
***Ronchamp***

- Strong formal similarity between roof form plus tower in elevation and thick wall plus chapel in plan.

***Redentore***

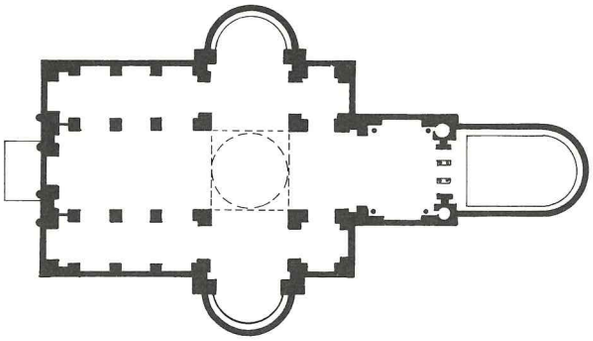
- Strong formal similarity between plan and section. Changes in plan form from orthogonal to circular coincide with similar changes in section and elevation.

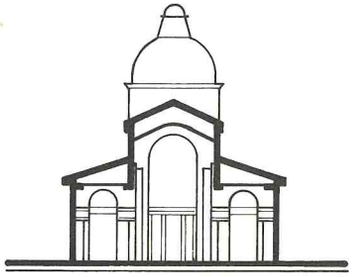


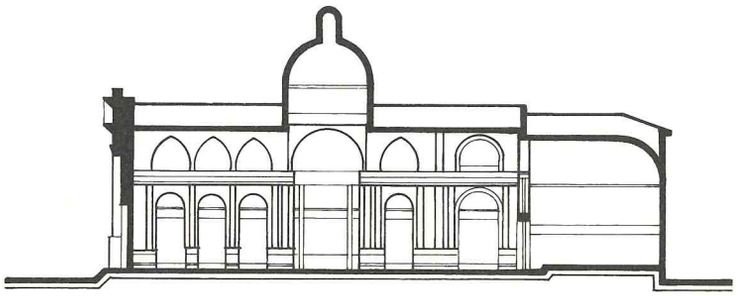


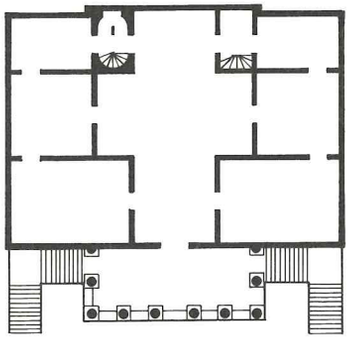
***San Giorgio***

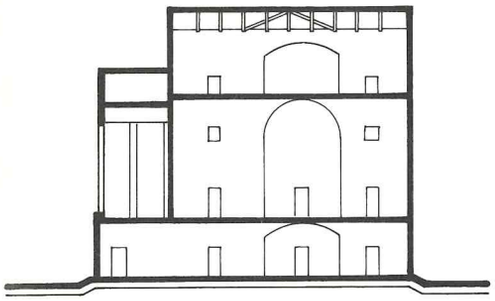
- Strong formal similarity between plan and section. Changes from orthogonal to circular forms are coincident in plan and section.





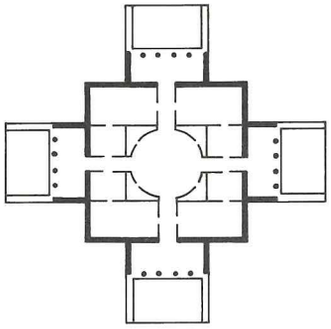


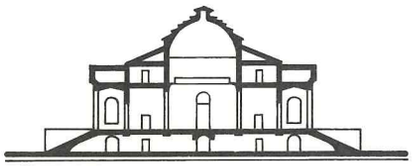




***Malcontenta***

- Dominant central plan form articulated on elevation.
- Three part division of plan is repeated in section and elevation.





***La Rotonda***

- Central plan form is dominant form in section.

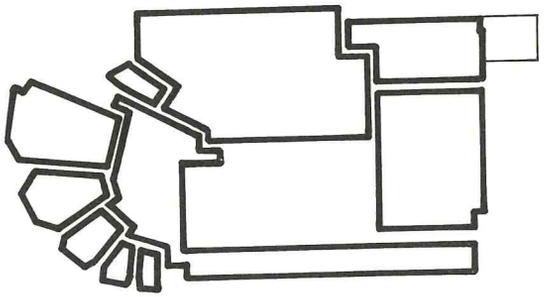
# RELATIONSHIPS

## UNIT TO WHOLE

The examination of parts of a built form as units and the relationships of these parts to the total building. Alternative relationships are; that the unit is the whole, the units aggregate to form the whole, and the whole is more than the aggregation of the units.

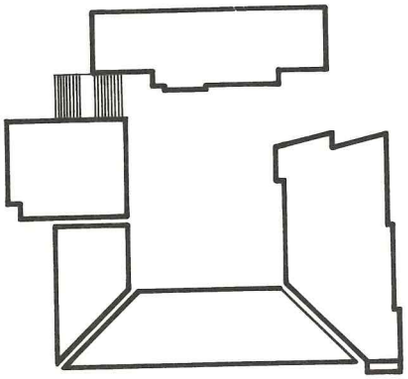
***Cultural Center***

- Units are various use spaces arranged to form open court.
- Whole is an aggregate of the units.



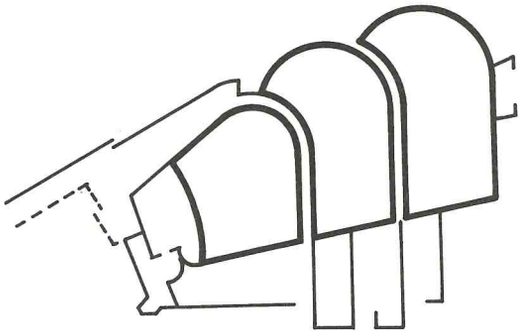
***Town Hall***

- Units expressed by changes in roof plane.
- Units arranged to form open courtyard.



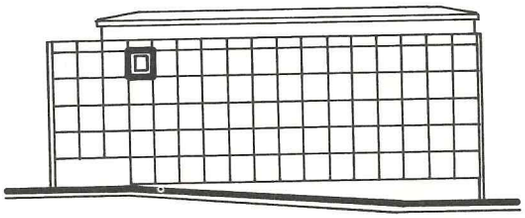
***Imatra***

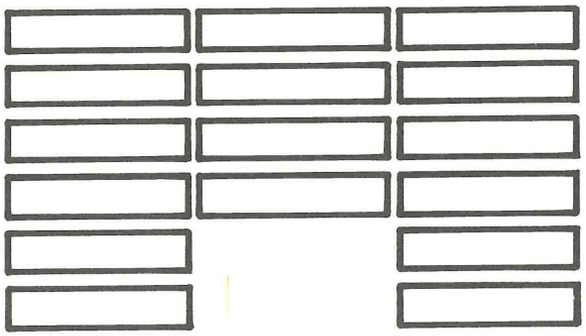
- Units are three subdivisions of major space that are similar in form and articulated internally.



***Enso/Gutzeit***

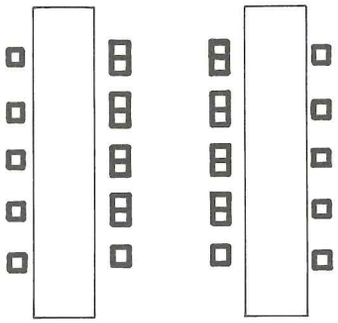
- Units relate to whole on several levels, window to stone cell, cell to elevation, and elevation to context.
- All forms are rectilinear.





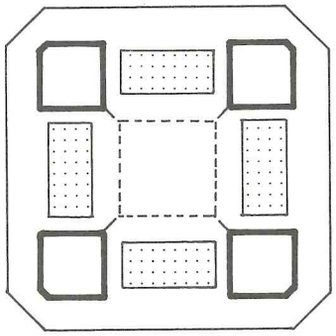
***Kimball Art Center***

- Units are structural vaults.
- Whole is an aggregate of the units.



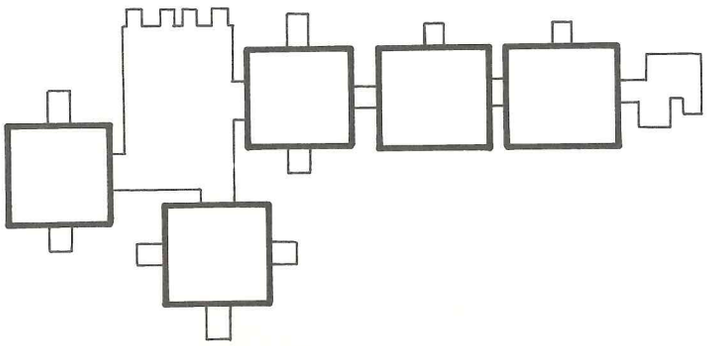
***Salk Institute***

- Units are service towers and small use spaces, distributed around larger use spaces.



***Exeter Library***

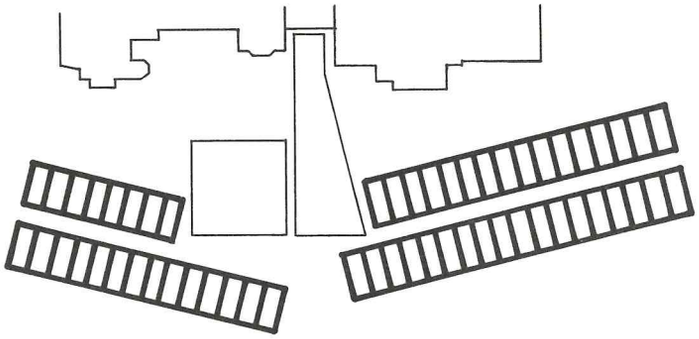
- Units relate to whole, first as enclosed forms in corners to adjacent use spaces, second as use spaces to open well, and then as open well to whole.



***Richards Medical Laboratory***

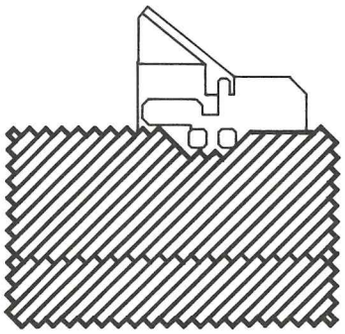
- Units relate to whole, first as articulated towers to use space and then as use space to whole.
- All units are rectilinear.

# JAMES STIRLING



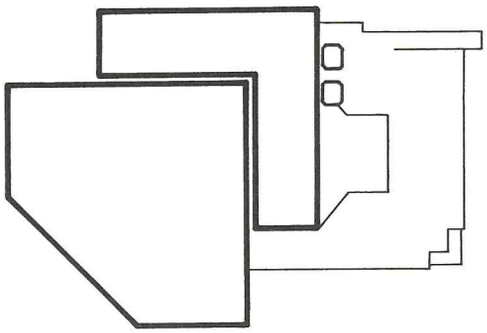
***Olivetti***

- Units are repetitive modular elements combined with special use spaces to form the whole.



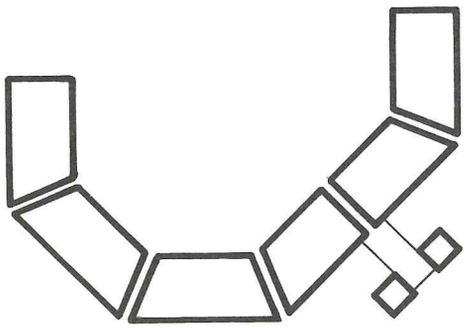
***Leicester***

- Units are repetitive angular roof elements over low building form.
- Low building form is an aggregate of units and is in contrast to the tower element.



***Cambridge History***

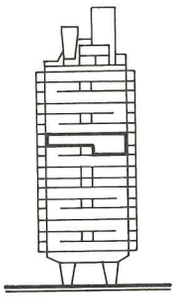
- Units are dominant building forms which include the major use space and adjacent smaller spaces.

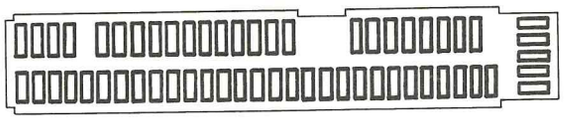


***Oxford Dorm***

- Units are vertical circulation towers and trapezoidal plan forms which are aggregated to form court.

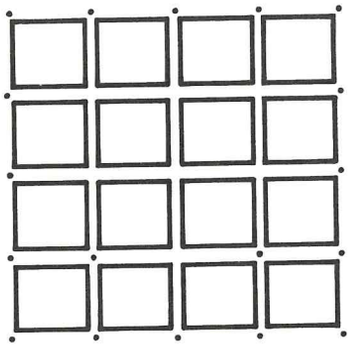
# LE CORBUSIER





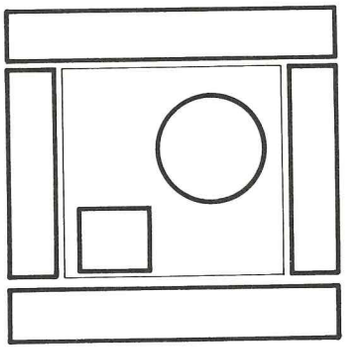
***Marseilles***

- Units are repetitive living cells which are aggregated to form whole.



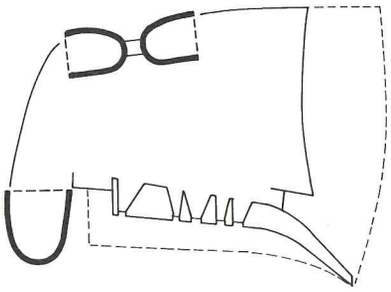
***Villa Savoye***

- Units are structural grids.
- Whole is an aggregate of the units.



***Assembly at Chandigarh***

- Units are simple geometric forms which define the boundaries and unique spaces in the building.

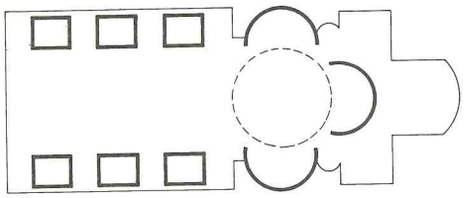


***Ronchamp***

- Units are semi-circular tower forms which are incorporated into a unique whole.

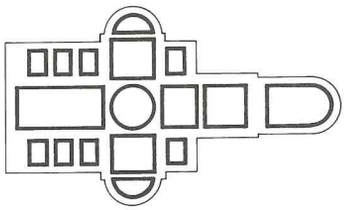
***Redentore***

- Units are grouped in threes as smaller chapels on sides of nave and semicircular forms around dome.



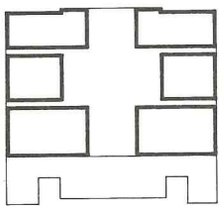
***San Giorgio***

- Units are implied spatial definitions comprising smaller chapels, nave, transepts, choir, and monk's chapel.
- Whole is an aggregate of spatial units.



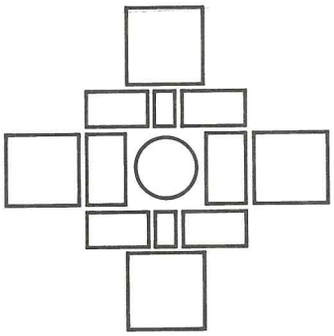
***Malcontenta***

- Units are rectilinear use spaces aggregated about major central space.



***La Rotonda***

- Units are major geometric plan forms, including stairs and portico, building mass and dome.
- Second level of units are rectilinear use spaces in building.
- Whole is an aggregate of units.



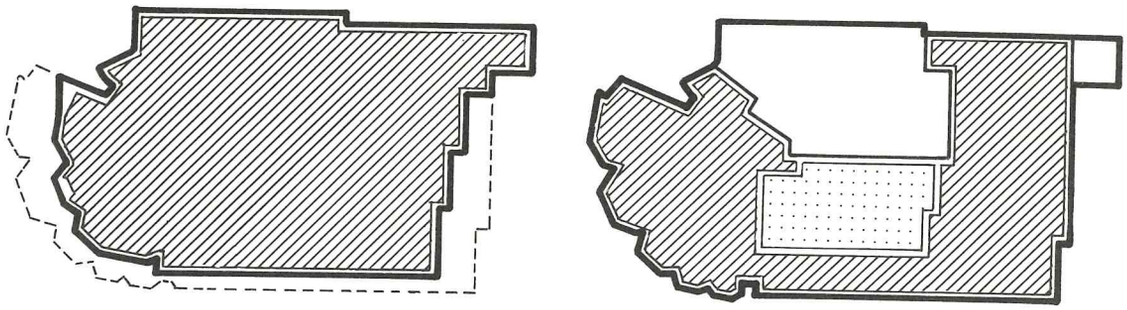
# RELATIONSHIPS

## INSIDE TO OUTSIDE

The examination of the configuration of the membrane which separates the exterior from the interior. The configuration can be such that the outside and the inside are the same or different. Contrast between inside and outside can result from differences in geometry, alignment, articulation, or form language.

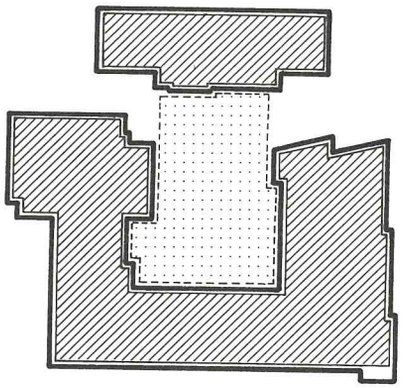
***Cultural Center***

- Interior form consistent with exterior form.
- Configuration of built form creates defined exterior space.



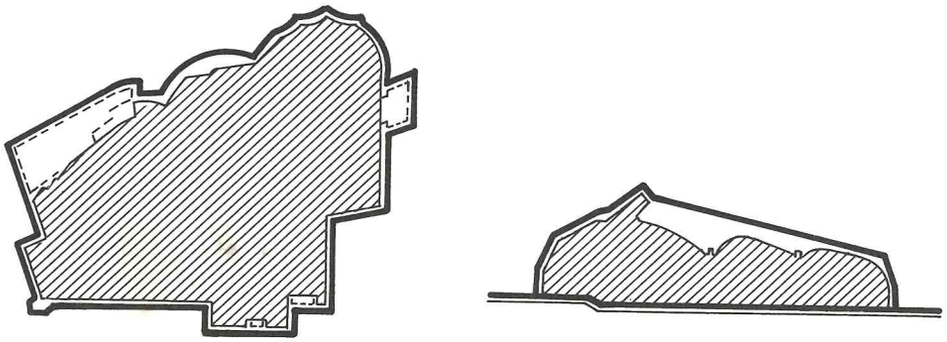
***Town Hall***

- Interior form consistent with exterior form.
- Configuration of built form creates defined exterior space.



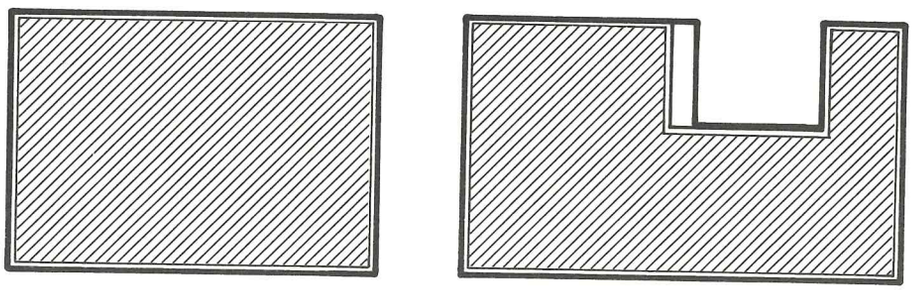
***Imatra***

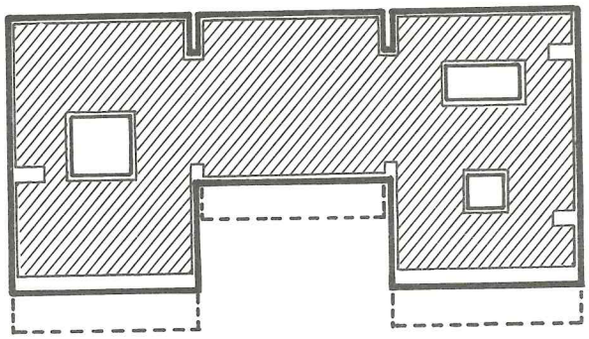
- Inconsistency between interior form and exterior form in both plan and section.
- Externally units are articulated on one side and combined into a single form on the other.



***Enso/Gutzeit***

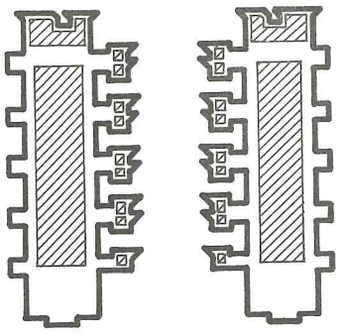
- Interior form consistent with exterior form.





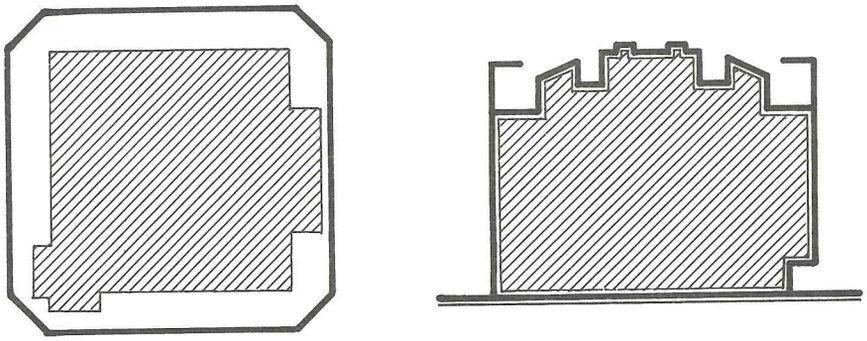
***Kimball Art Center***

- Inconsistencies between interior form and exterior form appear at lightwells and entrance canopies.



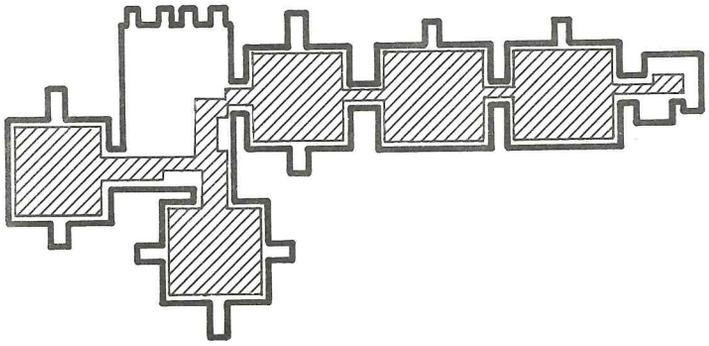
***Salk Institute***

- Inconsistency between interior form and exterior form caused by services and exterior circulation.



***Exeter Library***

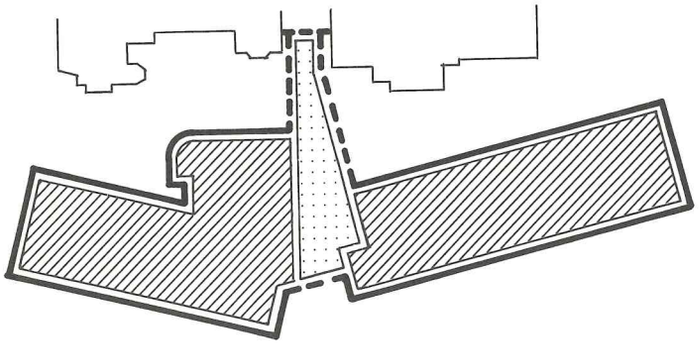
- Interior form consistent with exterior form with exception of ground floor arcade.



***Richards Medical Laboratory***

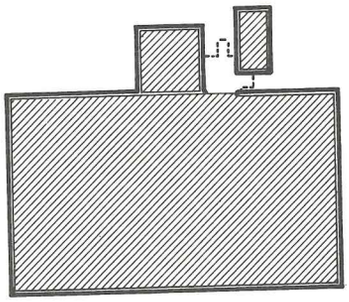
- Interior form consistent with exterior form with the exception of the service towers.

# JAMES STIRLING



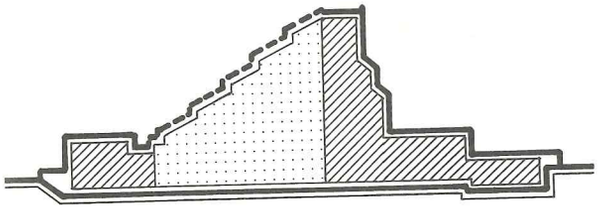
***Olivetti***

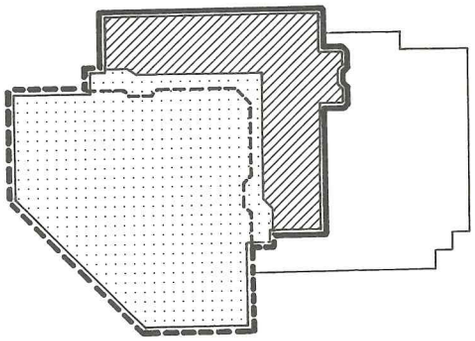
- Interior form consistent with exterior form.
- Glazed entry link generates indoor space that is visually open to exterior.



***Leicester***

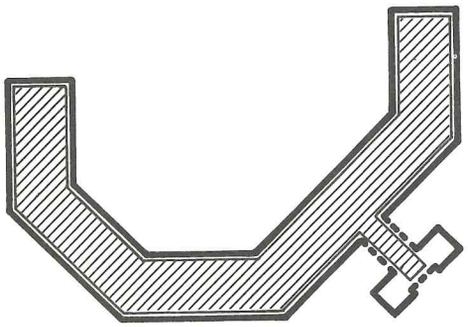
- Interior form consistent with exterior form.





***Cambridge History***

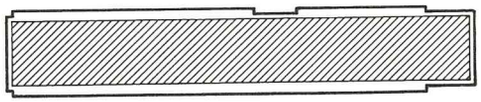
- Interior form consistent with exterior form with exception of double skin over major use space.
- Total glazing over major use space generates an interior space that is visually open to exterior.



***Oxford Dorm***

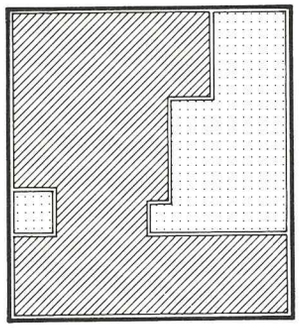
- Interior form consistent with exterior form.

# LE CORBUSIER



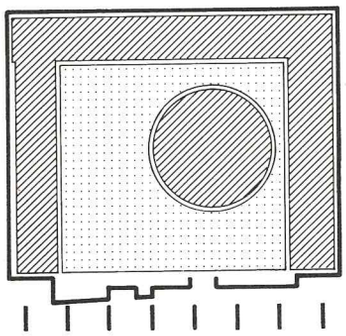
***Marseilles***

- Inconsistency between interior form and exterior form occurs at balconies of units.



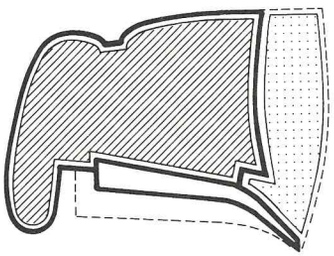
***Villa Savoye***

- Inconsistencies between interior form and exterior form occur at defined exterior spaces.



***Assembly at Chandigarh***

- Inconsistencies between interior form and exterior form occur at enclosed court-yard.



***Ronchamp***

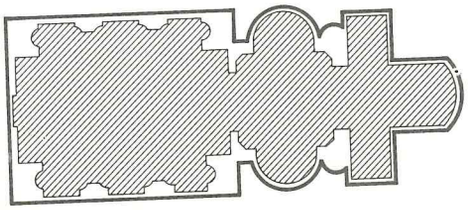
- Inconsistencies between interior form and exterior form occur at thick wall and defined exterior space.

# ANDREA PALLADIO

## INSIDE TO OUTSIDE

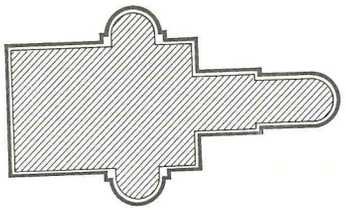
***Redentore***

- Inconsistencies between interior form and exterior form occur at structural elements in plan and between vaulted ceiling and pitched roof in section.



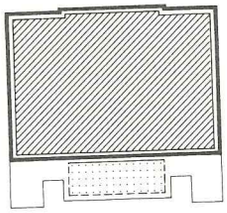
***San Giorgio***

- Inconsistencies between interior form and exterior form occur at structural elements in plan and between vaulted ceiling and pitched roof in section.



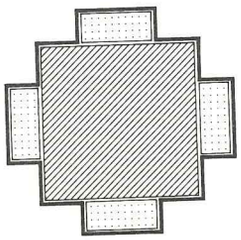
***Malcontenta***

- Interior form consistent with exterior form.



***La Rotonda***

- Interior form consistent with exterior form.



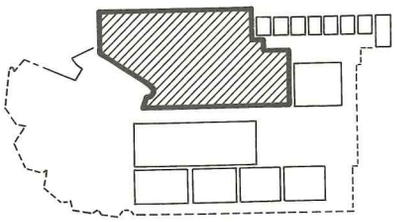
# RELATIONSHIPS

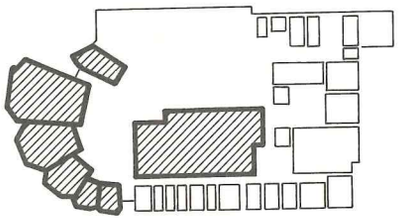
## REPETITIVE TO UNIQUE

The examination of the relationships between multiple elements and singular elements. The repetitive elements can be aggregated to form the unique, interrupted by the unique, originate from the unique, or serve as a counterpoint for the unique.

***Cultural Center***

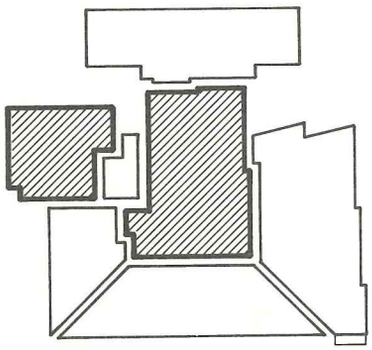
- Repetitive elements are interior rectilinear spaces.
- Unique elements are major use spaces that are either interior and non-rectilinear or exterior and defined by built form.





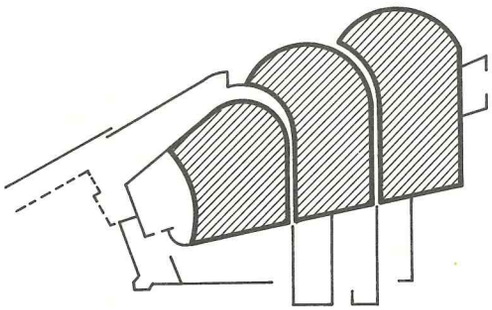
***Town Hall***

- Courtyard defined by configuration of repetitive elements.
- Unique elements are the two major public spaces, meeting room, and courtyard.



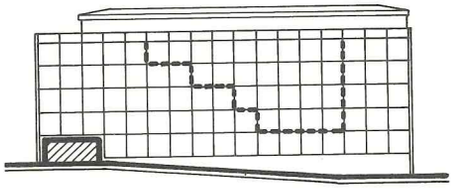
***Imatra***

- Unique elements are three segments of major space.

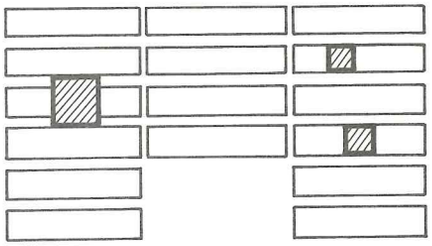


***Enso/Gutzeit***

- Unique elements of entrance and lightwell interrupt repetitive grid.
- Entrance and lightwell are voids within rectilinear form of building.

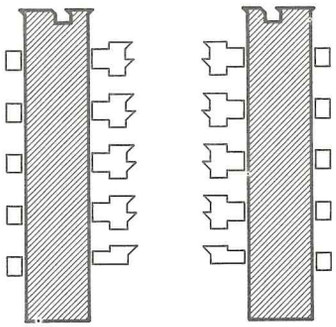


# LOUIS KAHN



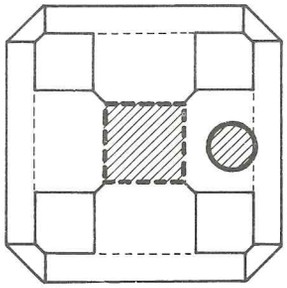
***Kimball Art Center***

- Repetitive elements are the structural vaults.
- Unique elements are three light courts which interrupt the repetitive units.



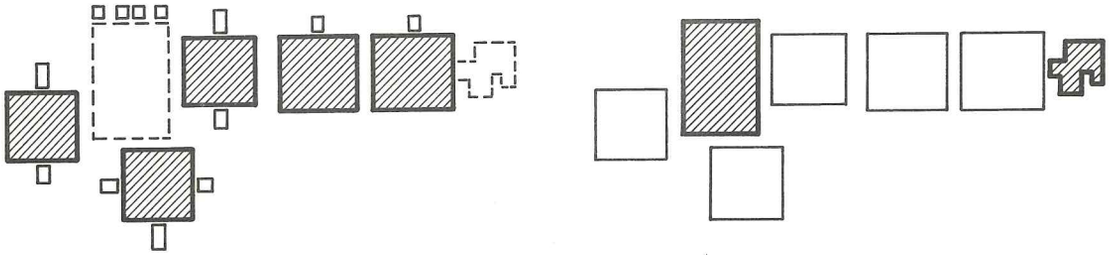
***Salk Institute***

- Repetitive elements are service towers and small use spaces.
- Unique elements are laboratories located between repetitive elements.



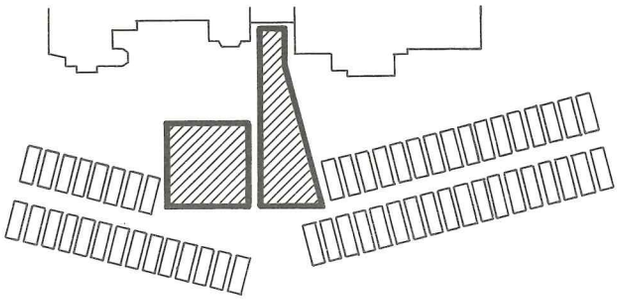
***Exeter Library***

- Repetitive elements are enclosed forms in corners and adjacent to use spaces.
- Unique elements are central lightwell and open stairway at entrance.



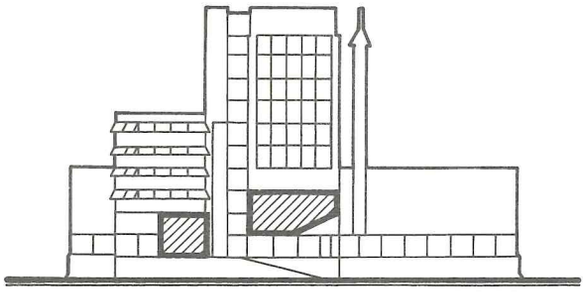
***Richards Medical Laboratory***

- Repetitive elements are service towers, adjacent to use spaces, and major use spaces.
- Unique elements are the two major service units.



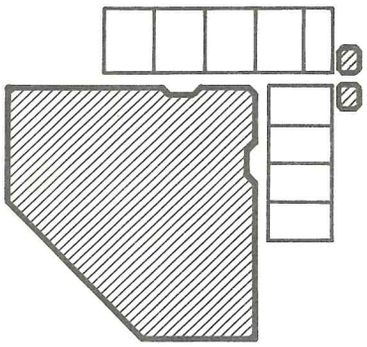
***Olivetti***

- Repetitive elements are modular units, which are combined to form smaller use spaces.
- Unique elements are entrance link and common space.



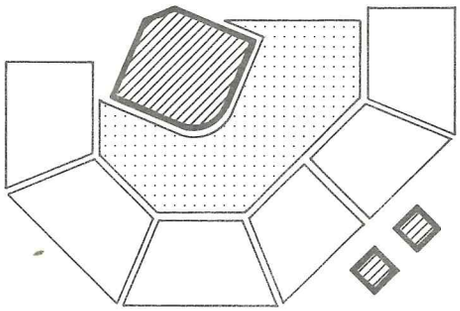
***Leicester***

- Repetitive elements are glazing units that are a major portion of the exterior skin.
- Unique elements are two auditoria expressed as sculpted forms on exterior.



***Cambridge History***

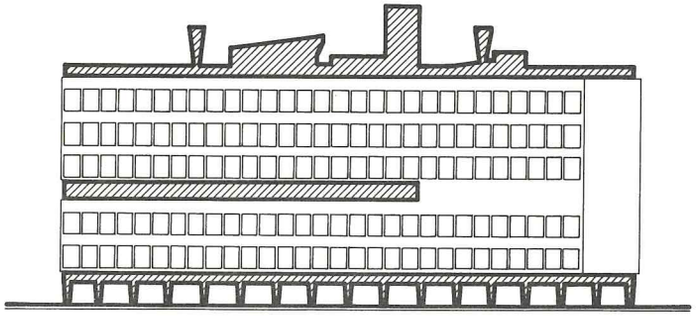
- Repetitive elements are the smaller spaces adjacent to major use space.
- Unique elements are the major use space and the vertical circulation towers.



***Oxford Dorm***

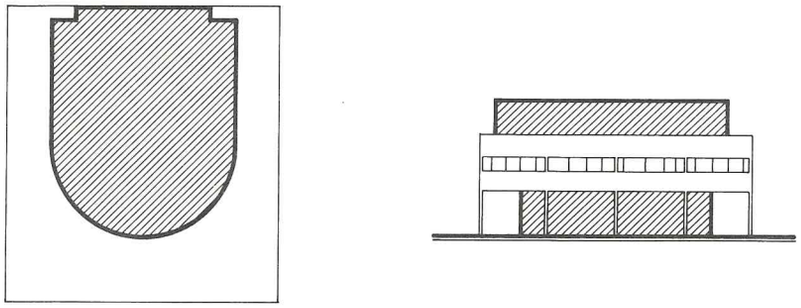
- Repetitive elements are the trapezoidal forms of the living spaces which create the courtyard.
- Unique elements are the major common space, vertical circulation elements, and exterior court.

# LE CORBUSIER



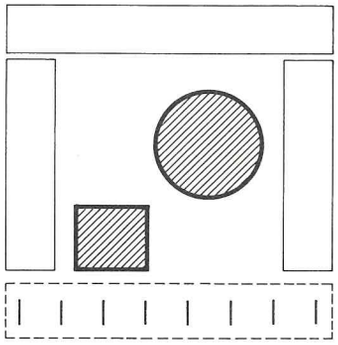
***Marseilles***

- Repetitive elements are the living units.
- Unique elements are special use spaces that occur at ground floor, mid-point of building, and roof.



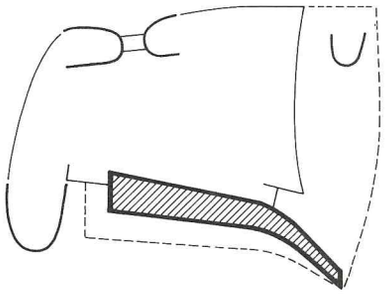
***Villa Savoye***

- Repetitive elements are rectilinear forms.
- Unique elements are curvilinear forms that occur on ground floor and roof.



***Assembly at Chandigarh***

- Repetitive elements are four rectilinear blocks at perimeter of building.
- Unique elements are interior geometric forms.



***Ronchamp***

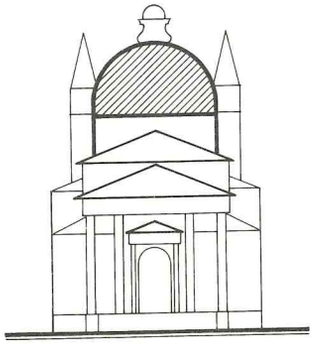
- Repetitive elements are semi-circular forms.
- Unique element is the thick wall.

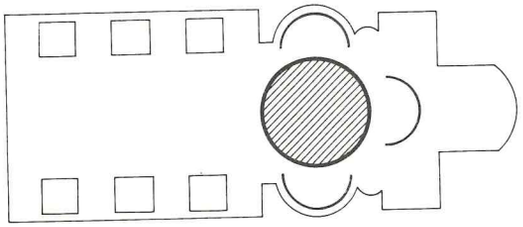
# ANDREA PALLADIO

## REPETITIVE TO UNIQUE

***Redentore***

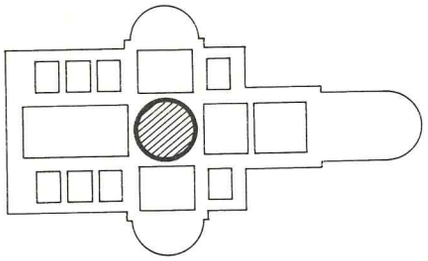
- Repetitive elements in plan are side chapels and semi-circular forms around altar.
- Repetitive elements in elevation are triangular pediments.
- Unique element in plan and elevation is the dome.





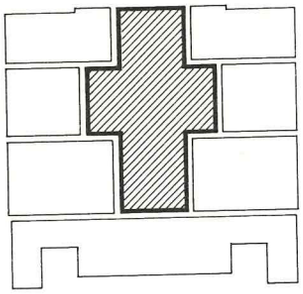
***San Giorgio***

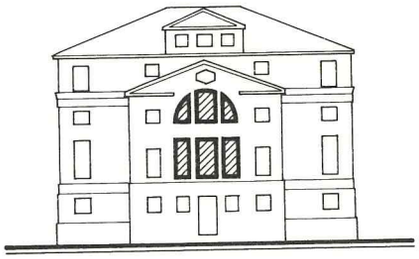
- Repetitive elements are implied spatial definitions.
- Unique element is the dome.



***Malcontenta***

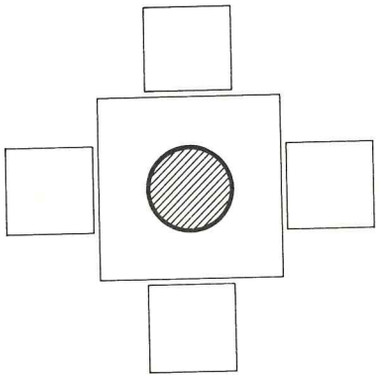
- Repetitive elements in plan are rectilinear use spaces.
- Unique element is the central cruciform space.
- Repetitive elements in elevation are orthogonal windows.
- Unique element in elevation is the arched configuration of 6 windows.





***La Rotonda***

- Repetitive elements are the square forms that include the stairs, porticos, and mass of building.
- Unique element is the dome.



# ORDERING IDEAS

## SYMMETRY/BALANCE-POINT/COUNTERPOINT

Generally symmetry and balance refer to the relationship of parts about a real or implied axis. Symmetrical order is achieved when equal elements have the same but opposing relationship to an axis. Symmetry embodies three basic manipulations: reflection, the mirror image of the element; rotation, the movement of the element about a center point; and translation, the movement of an element in a given direction while maintaining the same orientation.

Balanced order is achieved when different elements are compositionally arranged about an axis. A unique form of balance is point/counterpoint which is the juxtaposition of specific elements against other specific elements without necessary reference to an axis. Many times this condition appears as a positive to negative articulation.

# ORDERING IDEAS

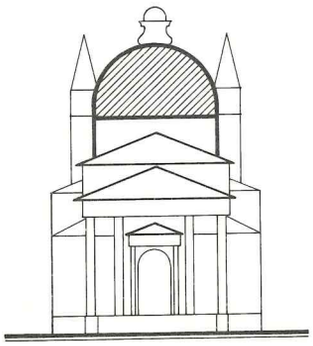
Ordering ideas create a conceptual framework for making decisions in the physical realm of design. While ordering ideas are not all inclusive to the generation of architecture, when they are central to the design process there is an observable impact on the physical solution. Thus the use of different ordering ideas can render diverse results. Similarly, one ordering idea engaged by different designers can contribute to generally diverse solutions.

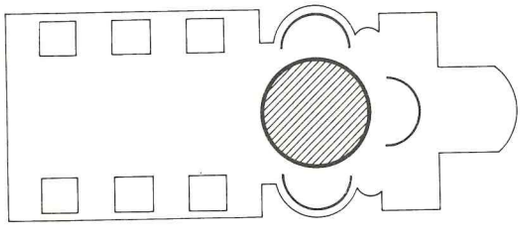
Ordering ideas include:

SYMMETRY/BALANCE-POINT/COUNTERPOINT
GRID/GEOMETRY
HIERARCHY
LAYERING

***Redentore***

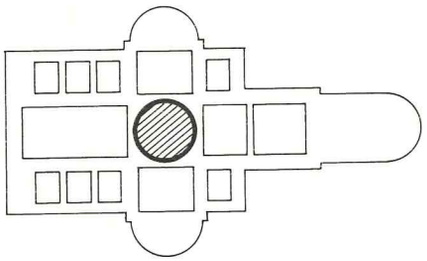
- Repetitive elements in plan are side chapels and semi-circular forms around altar.
- Repetitive elements in elevation are triangular pediments.
- Unique element in plan and elevation is the dome.





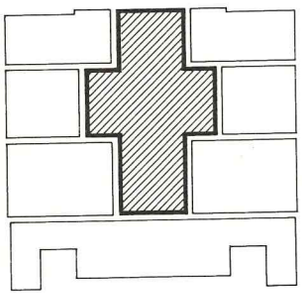
***San Giorgio***

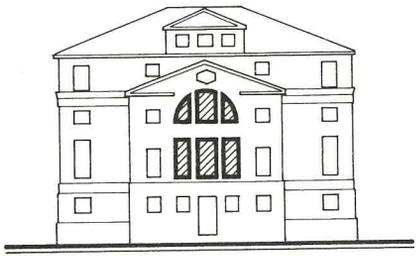
- Repetitive elements are implied spatial definitions.
- Unique element is the dome.



***Malcontenta***

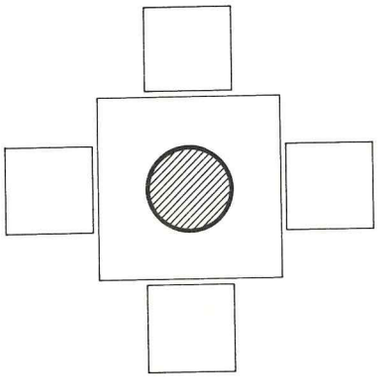
- Repetitive elements in plan are rectilinear use spaces.
- Unique element is the central cruciform space.
- Repetitive elements in elevation are orthogonal windows.
- Unique element in elevation is the arched configuration of 6 windows.





***La Rotonda***

- Repetitive elements are the square forms that include the stairs, porticos, and mass of building.
- Unique element is the dome.



# ORDERING IDEAS

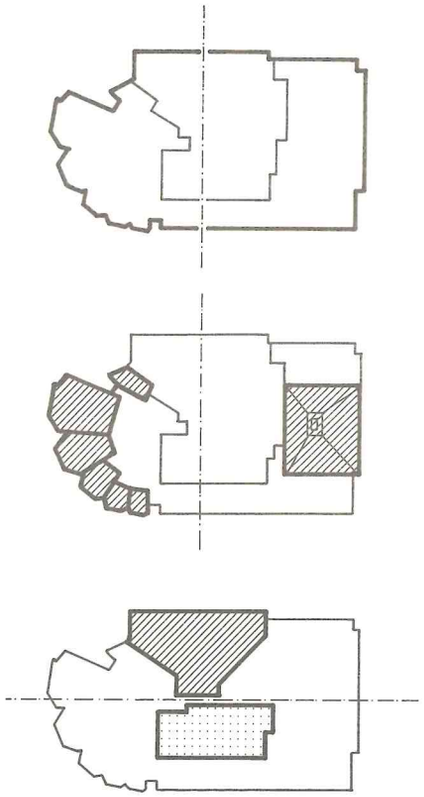
## SYMMETRY/BALANCE-POINT/COUNTERPOINT

Generally symmetry and balance refer to the relationship of parts about a real or implied axis. Symmetrical order is achieved when equal elements have the same but opposing relationship to an axis. Symmetry embodies three basic manipulations: reflection, the mirror image of the element; rotation, the movement of the element about a center point; and translation, the movement of an element in a given direction while maintaining the same orientation.

Balanced order is achieved when different elements are compositionally arranged about an axis. A unique form of balance is point/counterpoint which is the juxtaposition of specific elements against other specific elements without necessary reference to an axis. Many times this condition appears as a positive to negative articulation.

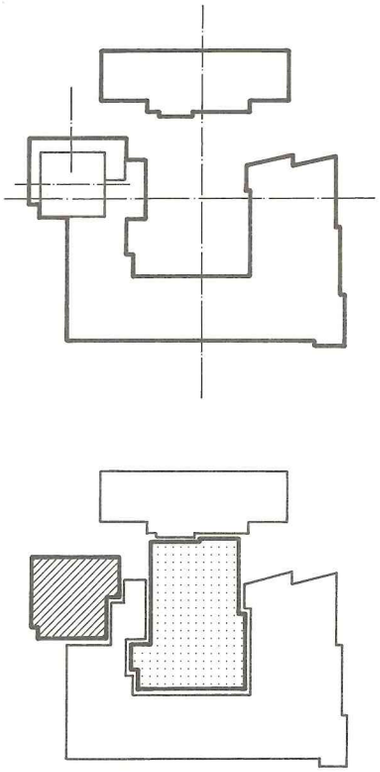
*Cultural Center*

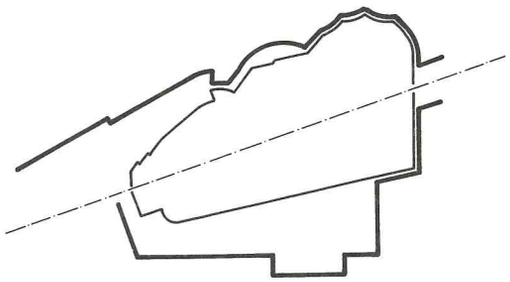
- Balance about 'y' axis created by uniquely shaped rooms on one side and unique roof form on other.
- Balance about 'x' axis by roof cover and library.



*Town Hall*

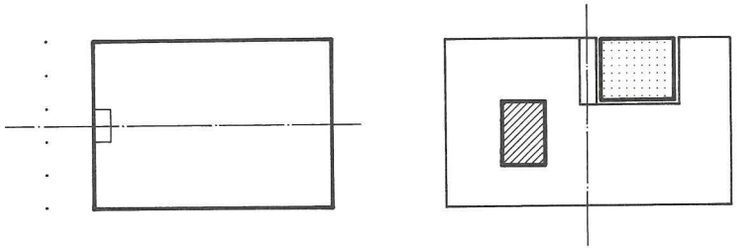
- Balanced about 'x' and 'y' axes.
- Meeting room symmetrical about 'x' axis.
- Courtyard is counterpoint to form of meeting room.





***Imatra***

- Tension about axis created by point/counterpoint of curvilinear and rectilinear exterior wall forms.

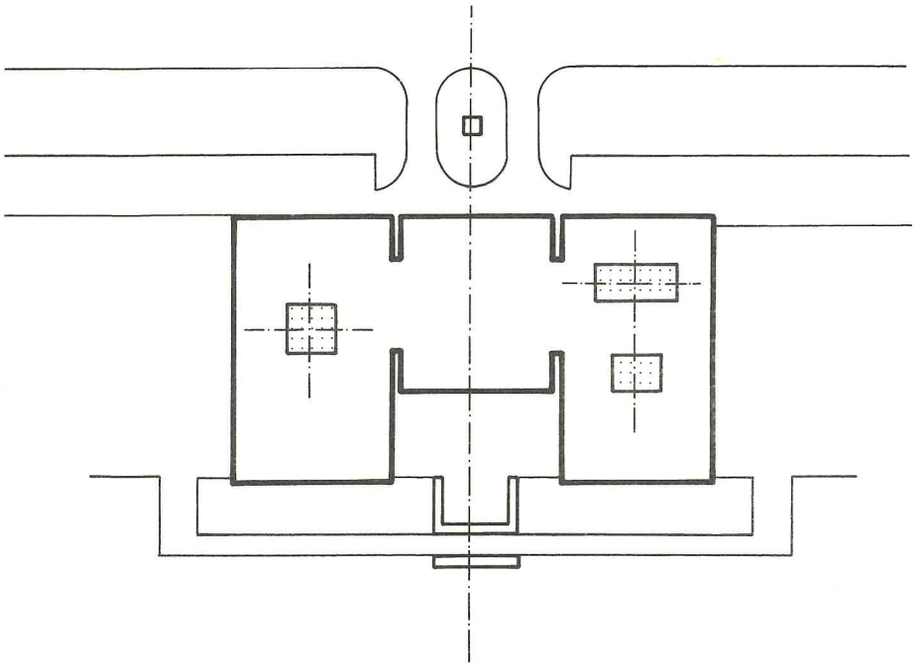


***Enso/Gutzeit***

- Entrance symmetrical about 'x' axis.
- Balance about 'y' axis created by point/counterpoint of angular and rectilinear exterior wall forms.

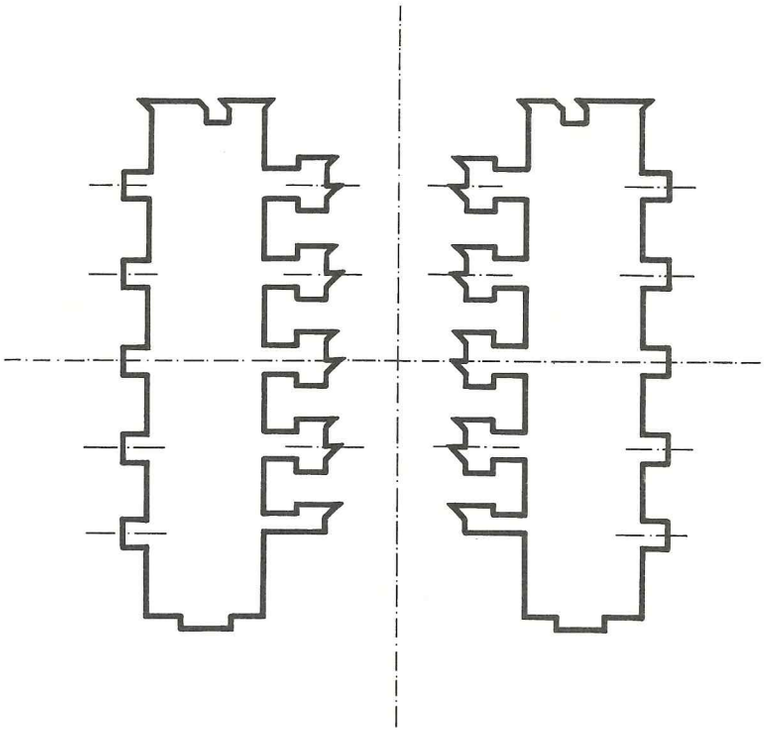
***Kimball Art Center***

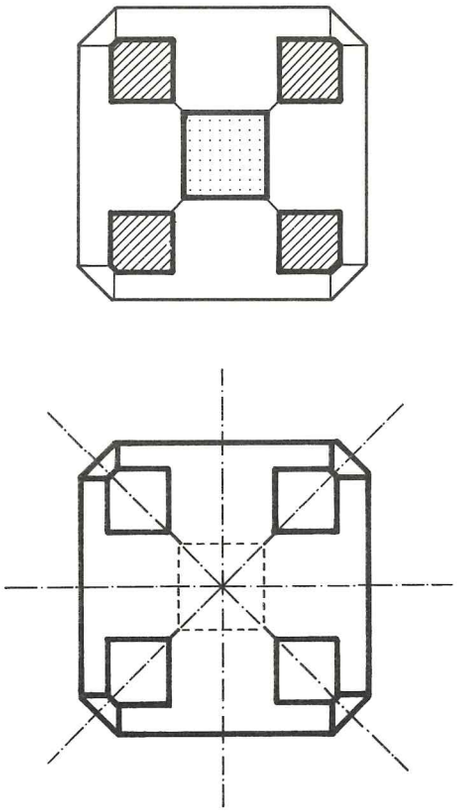
- Exterior is symmetrical about 'y' axis.
- Total form is balanced about 'y' axis.
- Internal courtyards are symmetrical to themselves about 'y' axis; two of the three are symmetrical about 'x' axis as well.



***Salk Institute***

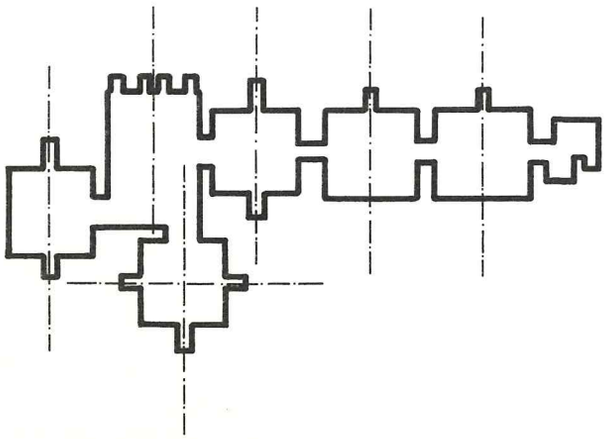
- Symmetrical by reflection about 'y' axis.
- Balanced about 'x' axis.
- Stair towers balanced about center lines.





***Exeter Library***

- Symmetrical about 'x' and 'y' axis.
- Symmetrical about both diagonals.
- Solid forms in corners are the counterpoint of the open central space.

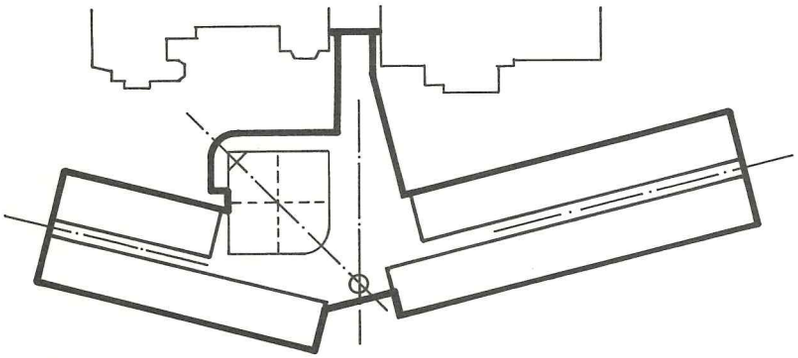


***Richards Medical Laboratory***

- Units are symmetrical about 'y' axis.
- Three original lab units are also symmetrical about 'x' axis.

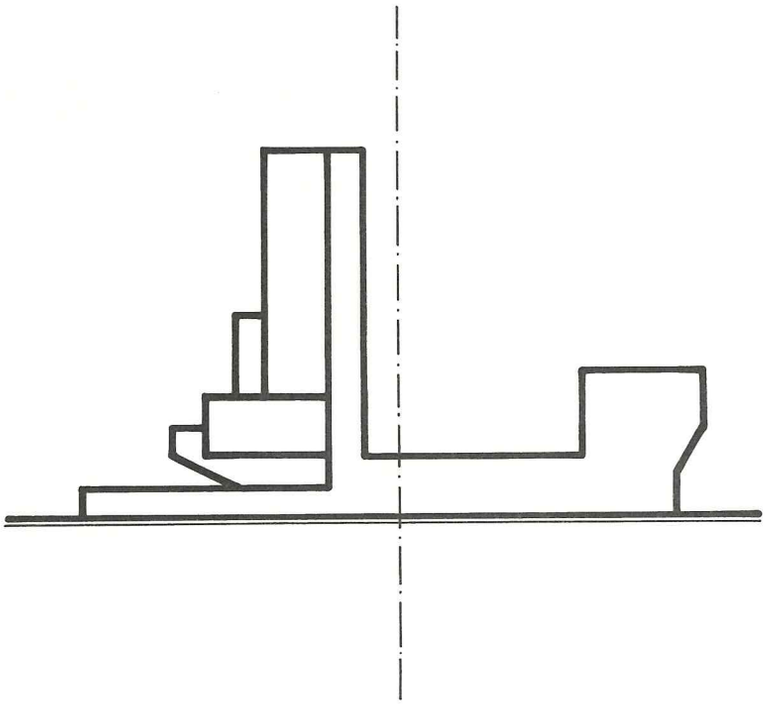
*Olivetti*

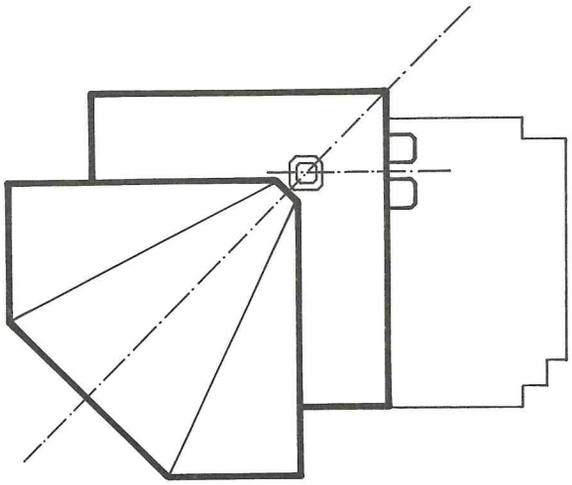
- Major common space is symmetrical about a diagonal axis which intersects a circular stair.
- Complex balanced about an axis which also coincides with the same circular stair.
- Small use spaces symmetrical about corridor axis.



*Leicester*

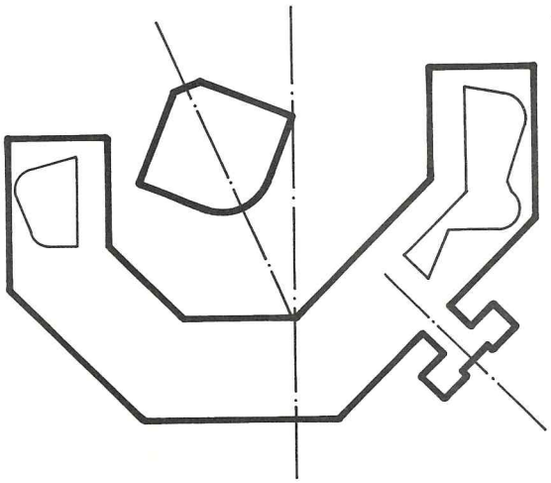
- Balance between the vertical elements on one side and horizontal form on the other.





*Cambridge History*

- Major use space symmetrical about diagonal axis.
- Vertical circulation towers are symmetrical about an axis that intersects the diagonal axis at a unique column condition.

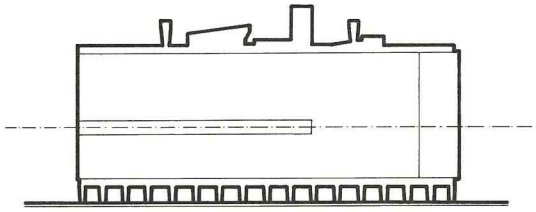


*Oxford Dorm*

- Vertical circulation towers are symmetrical about an axis that bisects the space between the two.
- Major common space is symmetrical about a diagonal axis which coincides with one of the unions of the trapezoidal forms.
- Whole complex is balanced about an axis which coincides with the same union of trapezoidal forms.

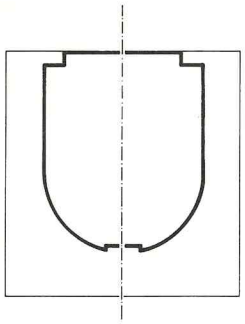
***Marseilles***

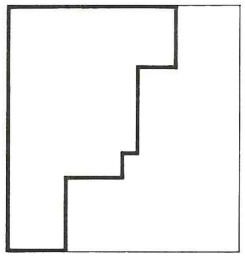
- Plan is balanced about centerline of corridor.
- Elevation is balanced about centerline of shopping street.

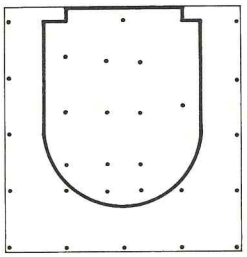


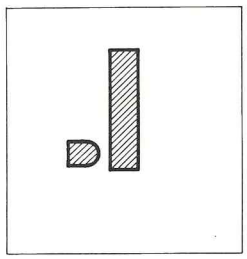
***Villa Savoye***

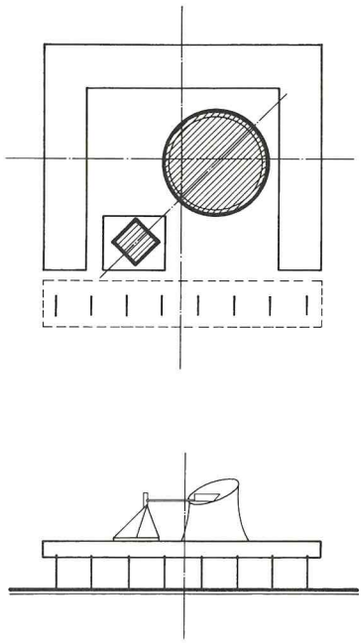
- Ground level plan generally symmetrical by reflection about 'y' axis.
- Middle level plan generally balanced about the diagonal.
- The orthogonal grid on the ground level plan is the counterpoint of the curved enclosed space.
- The stair with its curved form is the counterpoint of the ramp and perpendicular to the axis of the ramp.





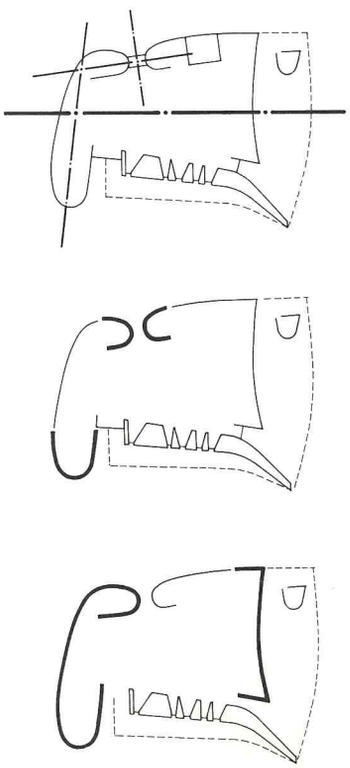






***Assembly at Chandigarh***

- Balanced about the 'y' and 'x' axes.
- Two interior forms are symmetrical about the diagonal and are counterpoints of each other.

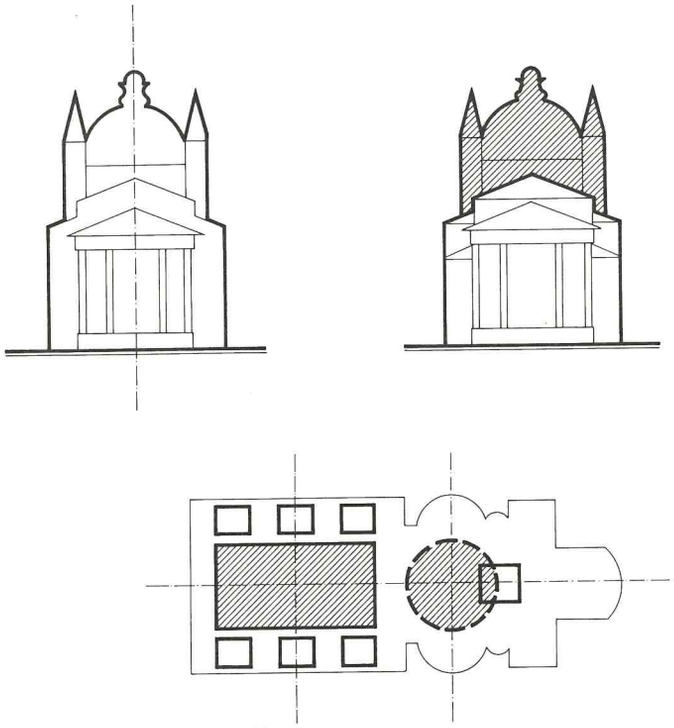


***Ronchamps***

- Plan is balanced about the 'x' axis and the side chapels are each balanced.
- Two small side chapels are the counterpoint of the other side chapel.
- Curved wall is the counterpoint of the opposing angular wall.

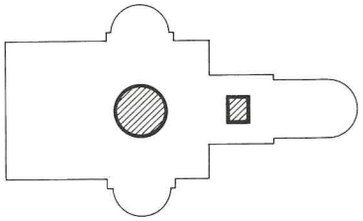
***Redentore***

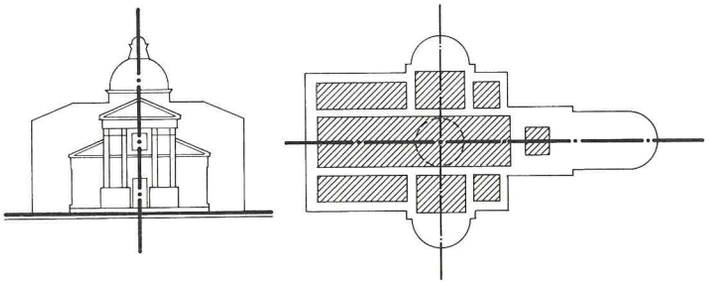
- Symmetrical by reflection about the 'y' axis.
- Dome form and drum is counterpoint of tri-angular roof form at nave and pediment.

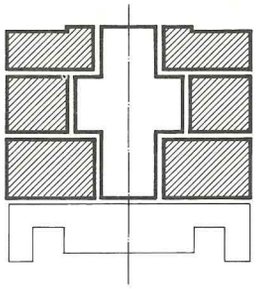


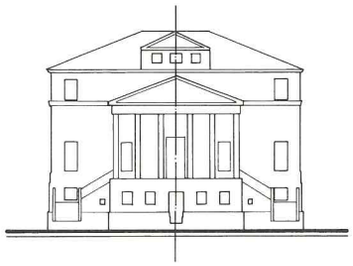
***San Giorgio***

- Symmetrical by reflection about the 'y' axis.
- Dome is counterpoint of altar.



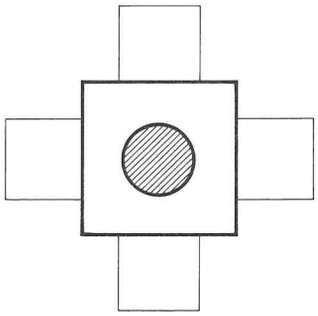


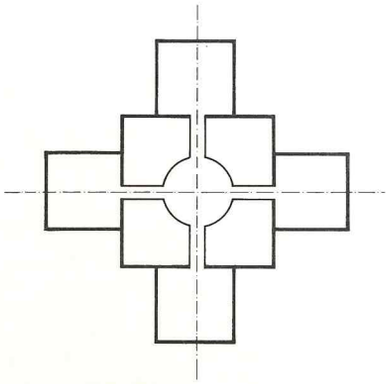




***Malcontenta***

- Symmetrical by reflection about 'y' axis.





***La Rotonda***

- Symmetrical about 'x' and 'y' axes.
- Dome is counterpoint of square mass of building.

# ORDERING IDEAS

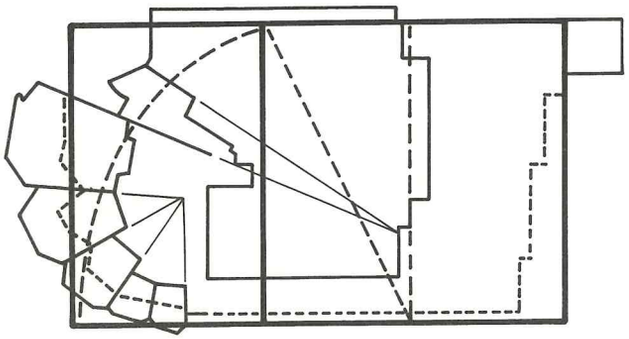
## GRID/GEOMETRY

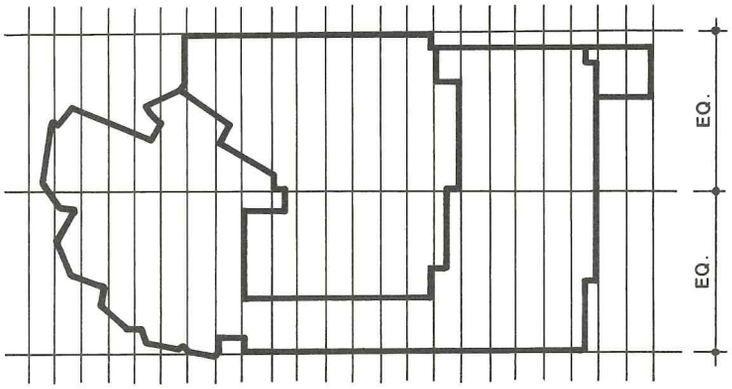
As an ordering idea grid/geometry embodies the use of geometric relationships to determine formal results. This includes the use of pure geometries; such as square, circle, triangle, and various manipulations of these geometries. Common manipulations are: proportional derivation, rotation, extension, overlapping, sub-division, and combination. Specific forms which develop from the proportional derivation of pure geometries are the golden section, and 1:1.4, 1:2, 1:3, etc. rectangles.

Grids can be developed from the repetition and sub-division of the pure geometries. Thus, the configuration and frequency of the grids can vary greatly.

***Cultural Center***

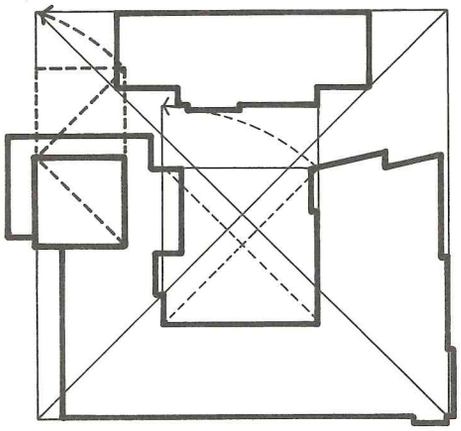
- Composite of rectilinear and angular geometries.
- Overall plan configuration developed from a 1.618 golden section rectangle.
- Subdivisions of golden mean rectangle relate generally to three major use areas: youth center, library/multi-purpose room, meeting rooms.
- Orthogonal grid, generally coincident with plan and structure, separates library and multi-use space.

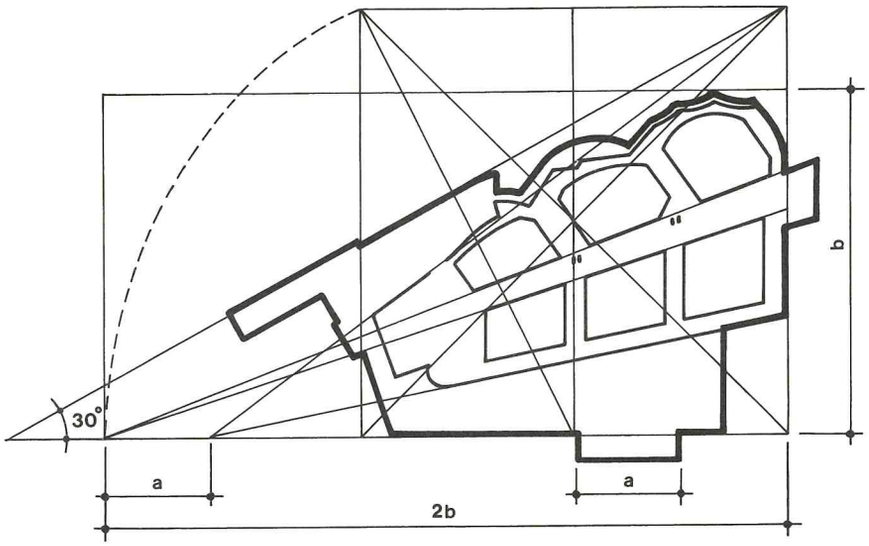





***Town Hall***

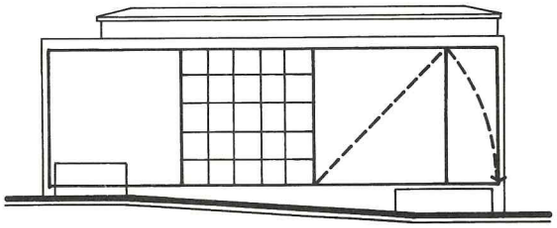
- Rectilinear geometry dominant.
- Overall plan configuration fits within a square.
- Courtyard is a 1.414 rectangle in plan.
- Meeting room is a square in plan.






***Imatra***

- Composite of rectilinear, angular, and curvilinear geometries.
- Overall plan configuration developed from a 1:2 rectangle and a square with a golden section that is coincident with long dimension of the rectangle.
- Angular plan forms radiate from points along perimeter of the rectangle and square.

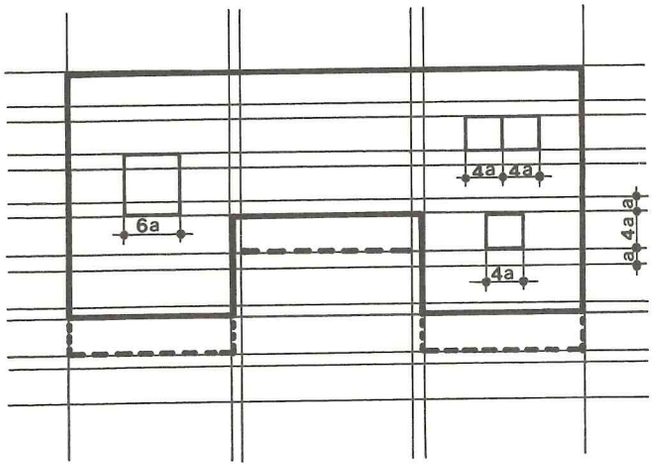


***Enso/Gutzeit***

- Rectilinear geometry dominant.
- Major elevation is a composite of two 5 x 5 unit squares and one 5 x 7 unit rectangle so that principle ratio of height to length is 1 : 3.414.

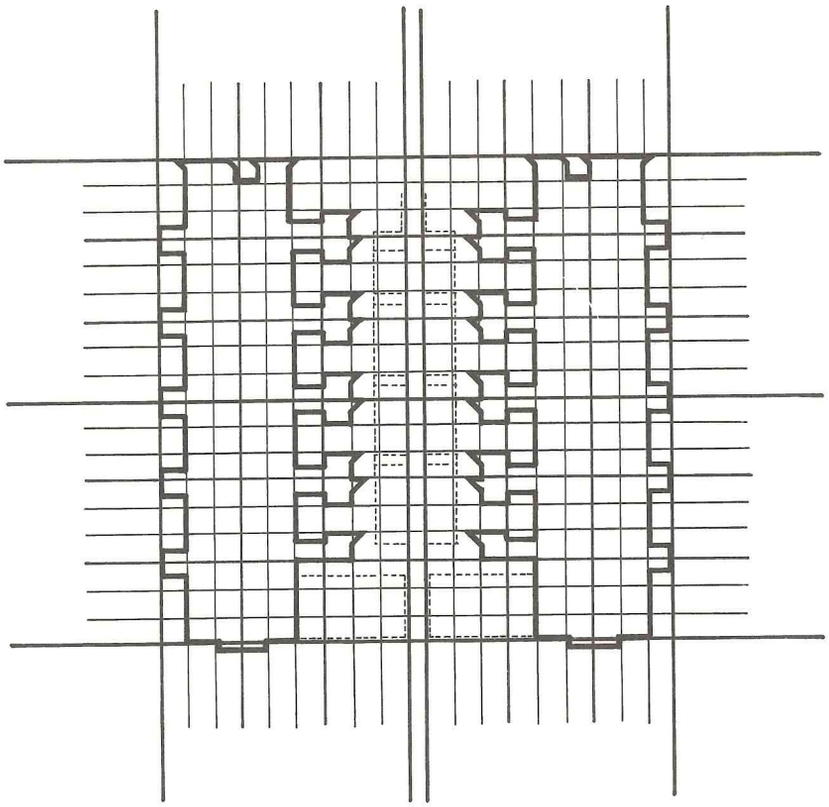
***Kimball Art Center***

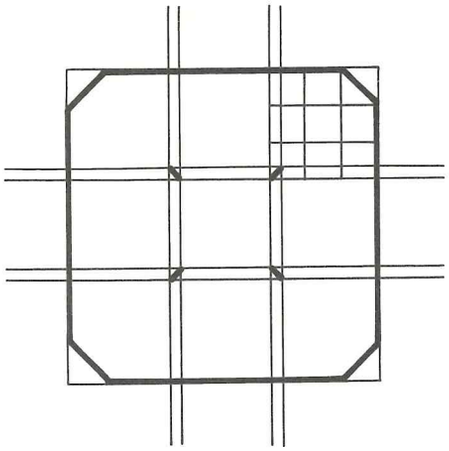
- Rectilinear geometry dominant.
- Orthogonal grid coincident with structural vault system.
- Vault width is 4 times the distance between the vaults.
- Light courts are squares or double squares and multiples of vault width.




***Salk Institute***

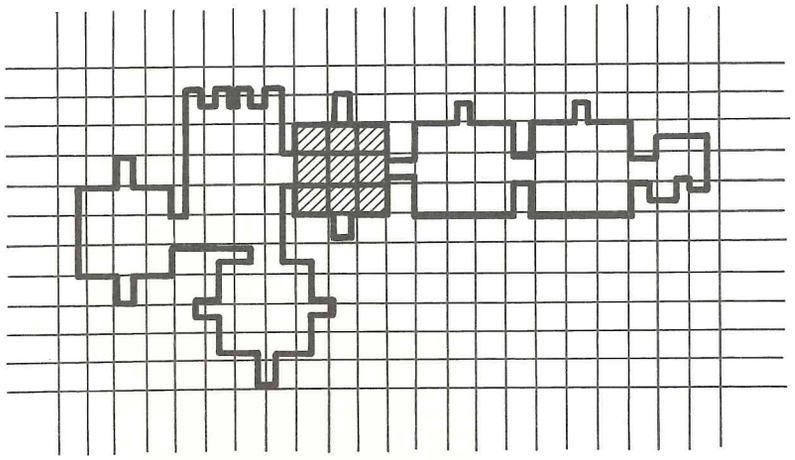
- Overall plan configuration based on a combination of 9 square relationships, each cell of which is further divided into smaller 9 squares.
- Each wing of the complex is based on the combination of two 9 square units.
- Ceremonial entrance to complex created by separation of 9 square units.





***Exeter Library***

- Rectilinear geometry dominant.
- Overall plan configuration based on a 9 square relationship—each cell of the plan is comprised of smaller 9 squares which overlap each other at the major grid lines.
- The corners of the building are formed by the diagonal of a square of the smaller 9 square.

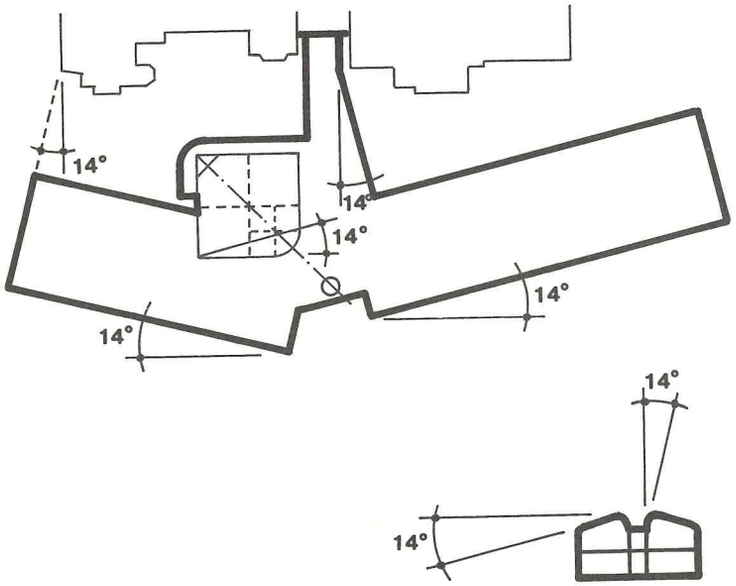


***Richards Medical Laboratory***

- Rectilinear geometry dominant.
- Major use space unit based upon a 9 square relationship.
- Nine square is the basis for overall planning grid.

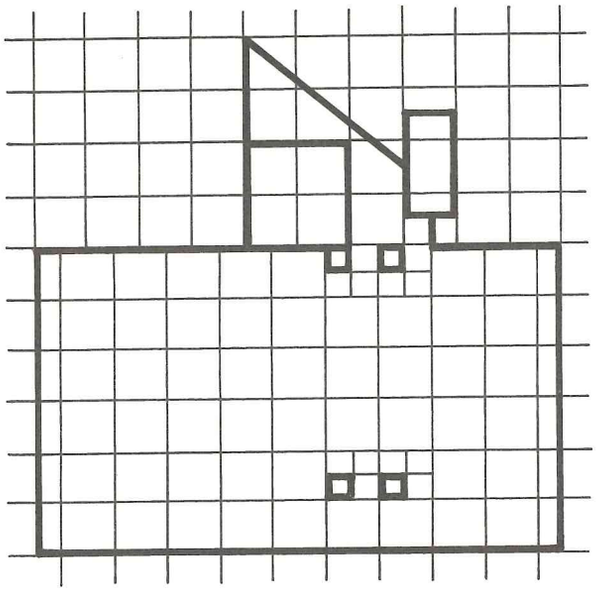
***Olivetti***

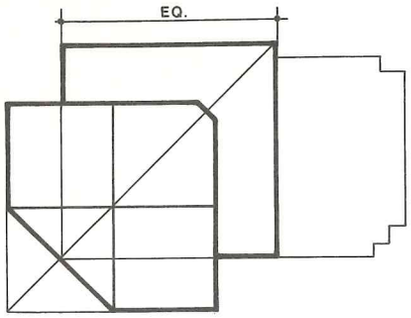
- Major common space based on 2 x 2 square grid, diagonal of which locates circular stair.
- One cell of 2 x 2 square grid further subdivided into a lesser 2 x 2 square which determines curve of major common space.
- Major plan and section forms developed from geometries related to golden section rectangle.




***Leicester***

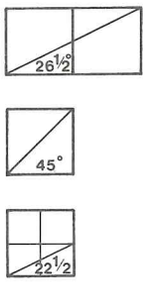
- Complex based upon a 10 x 10 square grid that is shifted 1/2 module at the juncture of the vertical elements and the horizontal form.
- Each vertical circulation element occupies 1/4 of a grid cell.
- Major auditorium is comprised of a 2 x 2 grid.

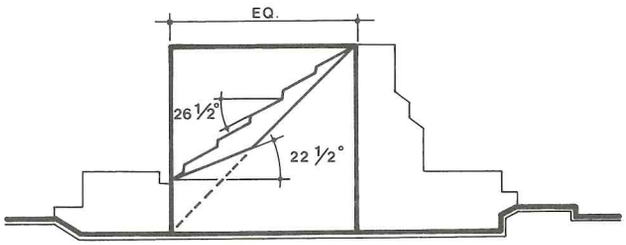


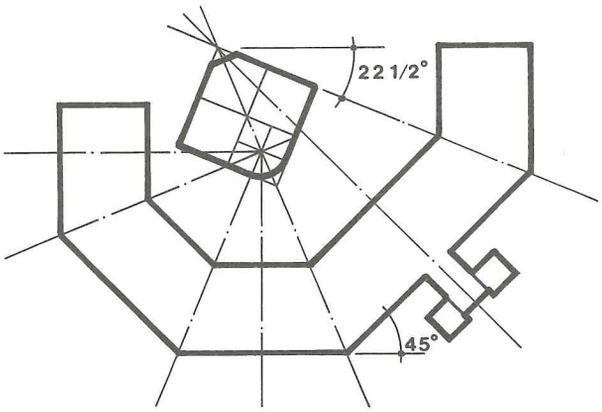



### *Cambridge History*

- Major plan configuration comprised of a 2 x 2 square grid truncated at a corner, and a form resulting from a 1/2 unit diagonal shift of the 2 x 2 square.
- Major use space, in section, is generated from a square.
- Glazed roof form of major use space is developed from geometries related to squares.

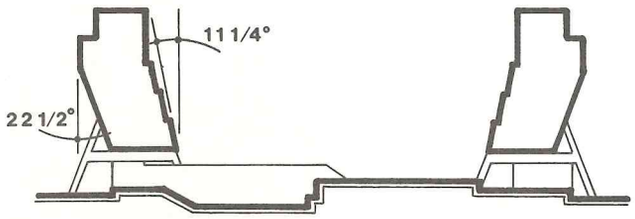


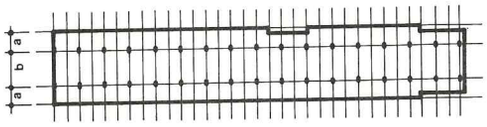

### *Oxford Dorm*

- Major common space generated from 2 x 2 square grid, one cell of which is further subdivided into another 2 x 2 square. The intersection of the lesser grid lines forms the point from which a series of radial axes originate.
- A second series of radials originate from a corner of the larger 2 x 2 square.

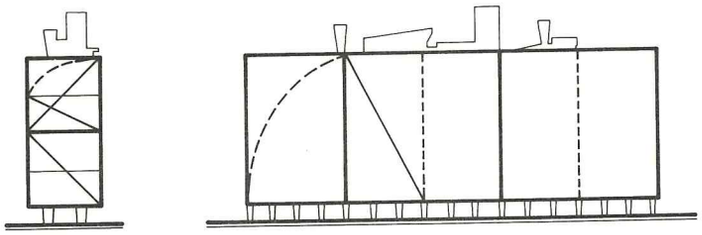


***Marseilles***

- Plan based on an orthogonal grid with a 3:5 ratio.
- End and side elevations developed from square and golden section geometrics.

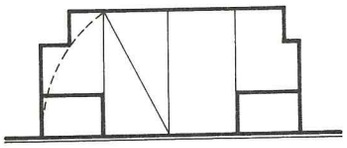


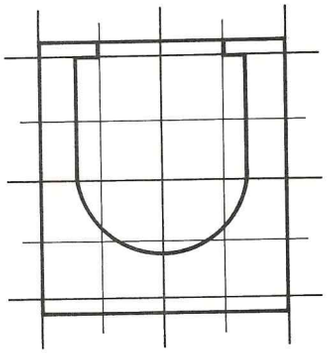

a:b : 3:5

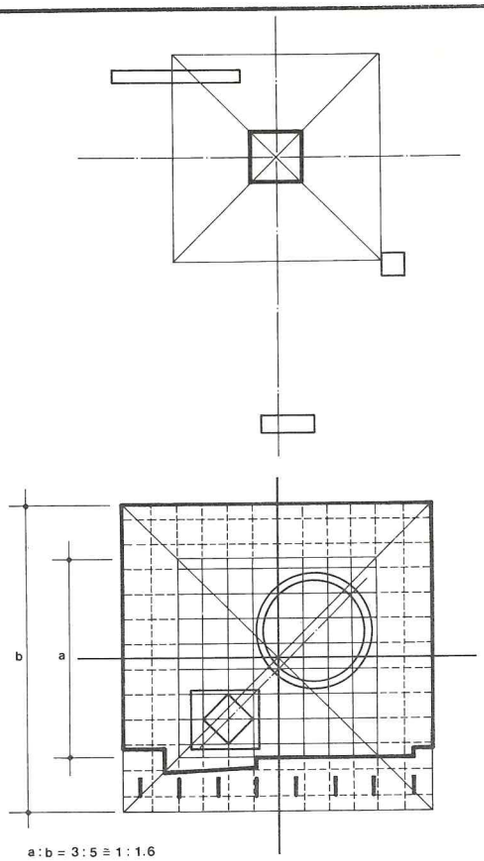


***Villa Savoye***

- Basic elevation developed from golden section geometry.
- Overall plan configuration based on a 2 x 2 grid with each cell subdivided into another 2 x 2 grid.

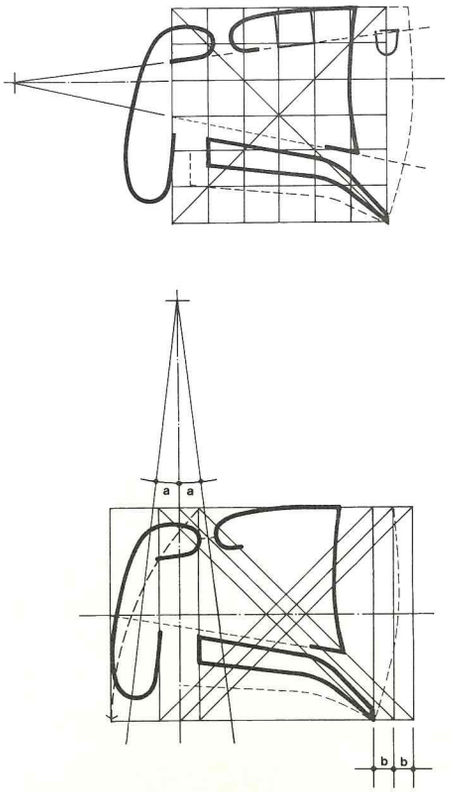







***Assembly at Chandigarh***

- Site plan developed from a square geometry with the Assembly Building the center of the square.
- Overall plan of building is a square that is first subdivided into a 2 x 2 grid, each cell of which is further divided into a finer grid.
- Interior court is a square with a geometrical relationship to the building whole of 3:5 (1:1.6).

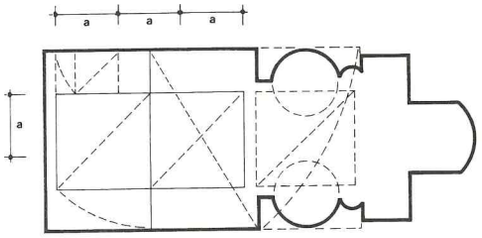


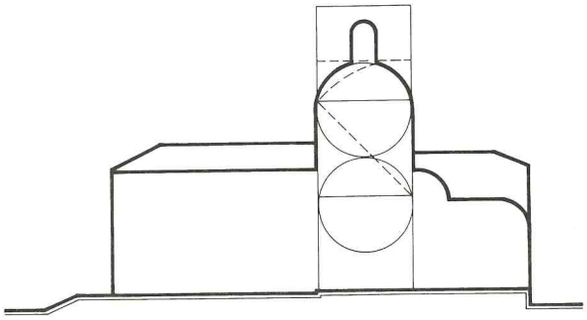

***Ronchamp***

- Plan geometries coincident with significant points on a 6 x 6 square grid.
- Overall plan configuration based upon a 1:1.4 rectangle with shifted squares within.
- Angle formed by cross on floor and line through center of main entrance is the same angle formed by line through center of main entrance and line through center of entrance between chapels.

***Redentore***

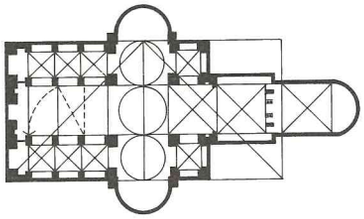
- Interior height of dome is 2½ times its diameter.
- Height to tallest point is 3 times the diameter of the dome.
- Major component of nave is comprised of two squares which are the same dimensions as the dome.
- Width of side aisles is determined by manipulation of the geometry of the square.

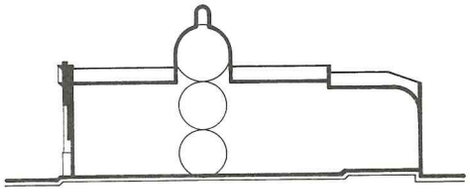


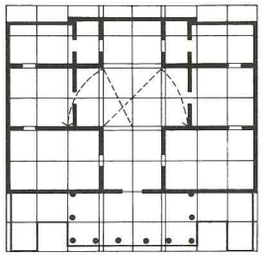



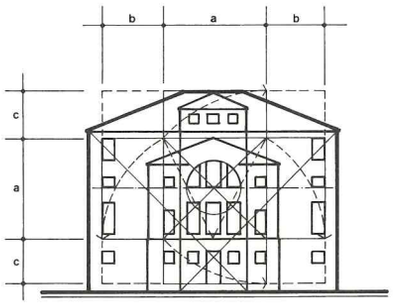
***San Giorgio***

- Interior height of dome is 3 times its diameter.
- Basic plan form is comprised of two squares joined at center line of dome with diameter of dome that is 1/3 the size of a side of the squares.
- Two major squares in plan are subdivided into 9 squares each.
- Side chapels are squares in plan.







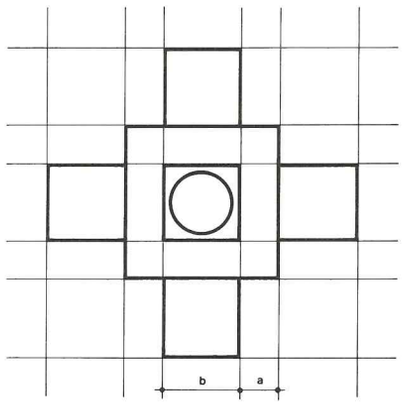


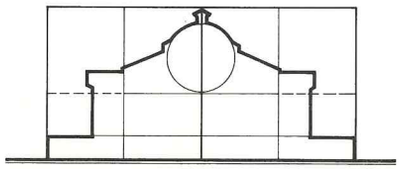

a : b = 1 : 1.6

a : c = 1 : 1.4

***Malcontenta***

- Plan configuration derived from square grid.
- Center of cruciform configuration is a square, the shorter legs are derived from the golden section.



***La Rotonda***

- Basic plan form is a square subdivided into an 'a', '2a' grid.
- Elevation is contained within two squares joined at center line of dome. Larger squares are subdivided into a 2 x 2 grid.

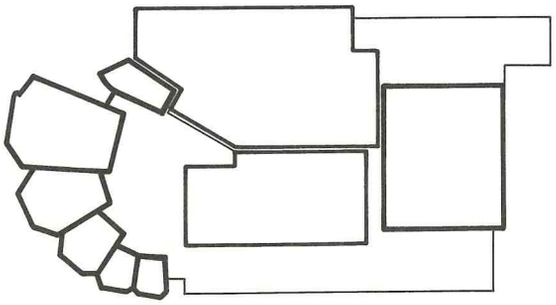
# ORDERING IDEAS

## HIERARCHY

Hierarchy is the rank ordering of parts relative to a common physical attribute.

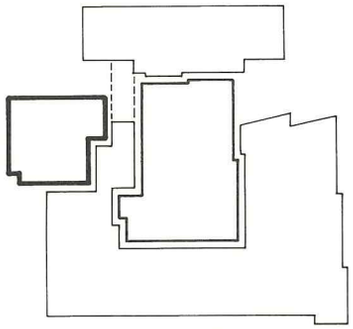
***Cultural Center***

- From most important to least
  1. Meeting rooms and youth center
  2. Library and exterior court
  3. Remainder of building



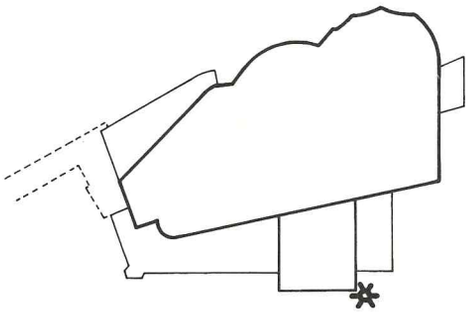
***Town Hall***

- From most important to least
  1. Meeting room
  2. Courtyard
  3. Remainder of building
  4. Lattice at entrance



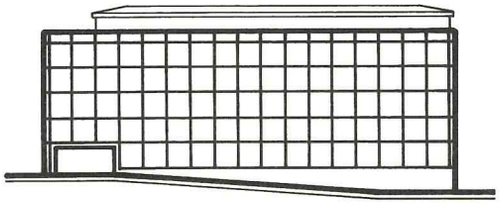
***Imatra***

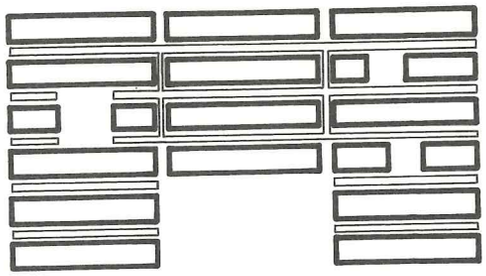
- From most important to least
  1. Bell tower
  2. Major space
  3. Entrance
  4. Remainder of building
  5. Canopy at secondary entrance



***Enso/Gutzeit***

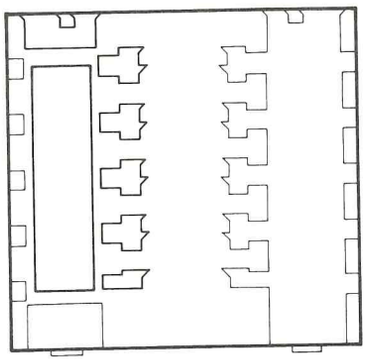
- From most important to least
  1. Overall rectangle of building form
  2. Entrance cavity
  3. Elevation grid
  4. Penthouse





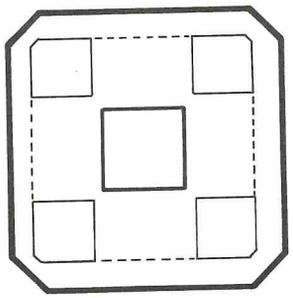
***Kimball Art Center***

- From most important to least
  1. Structural vaults
  2. Spaces between vaults
  3. Court spaces



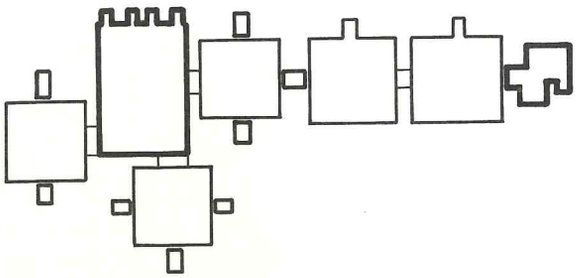
***Salk Institute***

- From most important to least
  1. Overall building configuration
  2. Laboratories
  3. Small use spaces
  4. Service spaces



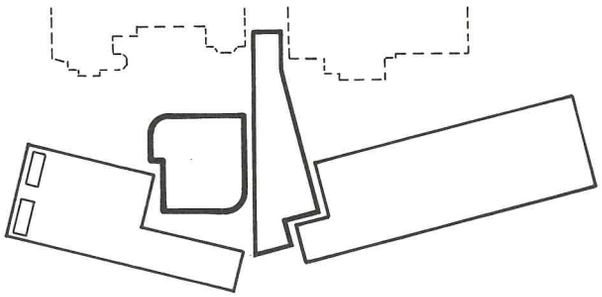
***Exeter Library***

- From most important to least
  1. Overall building form
  2. Central lightwell
  3. Enclosed forms in corners
  4. Spaces adjacent to closed forms



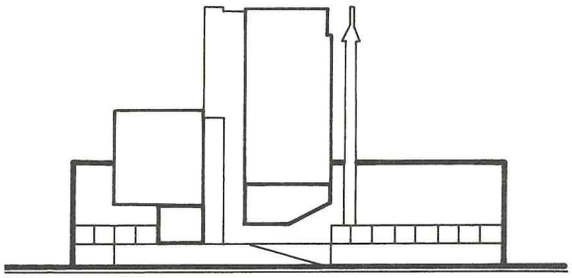
***Richards Medical Laboratory***

- From most important to least
  1. Major service units
  2. Service towers adjacent to major use spaces
  3. Major use spaces
  4. Circulation links



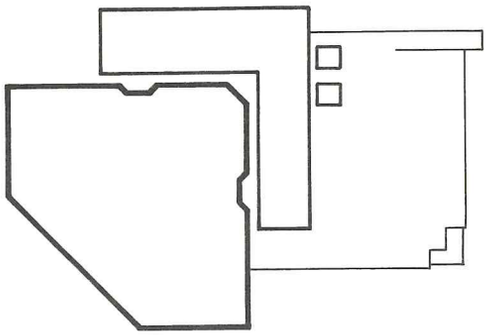
***Olivetti***

- From most important to least
  1. Major common space
  2. Circulation link
  3. Smaller use spaces
  4. Modular elements
  5. Existing building



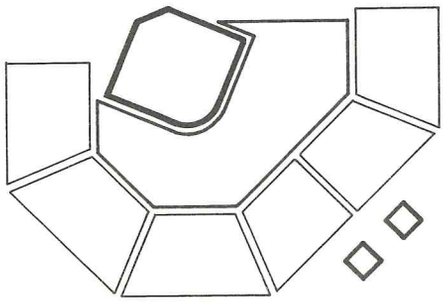
***Leicester***

- From most important to least
  1. Horizontal building form
  2. Two auditoria
  3. Use spaces in towers
  4. Remainder of building



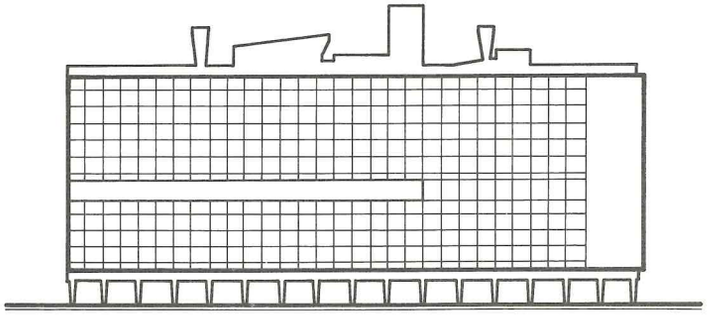
***Cambridge***

- From most important to least
  1. Major use space
  2. Adjacent smaller spaces and circulation towers
  3. Remainder of building



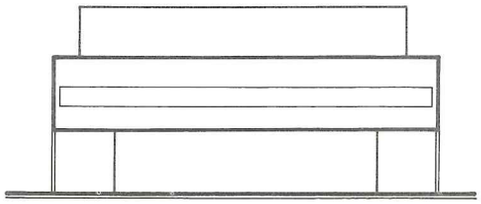
***Oxford***

- From most important to least
  1. Major common space
  2. Circulation towers
  3. Open court
  4. Trapezoidal forms of living units



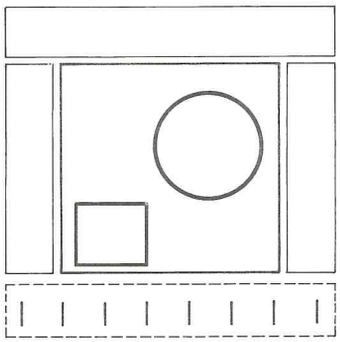
***Marseilles***

- From most important to least
  1. Main block of building
  2. Pilotis and roof forms
  3. Shopping street at mid-building
  4. Grid of living units



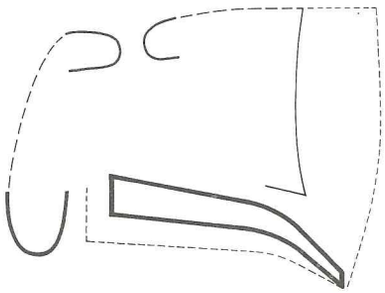
***Villa Savoye***

- From most important to least
  1. Block of main floor of building
  2. Block of ground floor and roof forms
  3. Strip windows in main block



***Assembly at Chandigarh***

- From most important to least
  1. Two unique interior forms
  2. Internal court and sun screen supports
  3. Rectangular buildings blocks which enclose internal court
  4. Canopy of sun screen

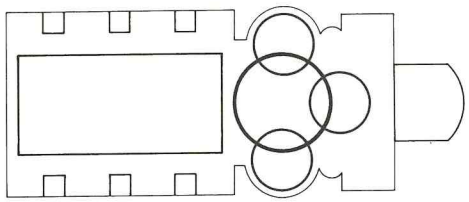


***Ronchamp***

- From most important to least
  1. Thick wall
  2. Main side chapel
  3. Two small side chapels
  4. Front wall
  5. Remainder of building

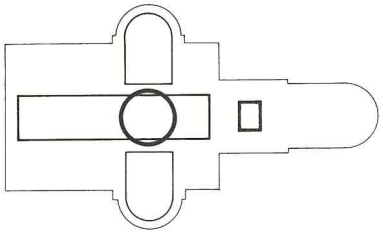
***Redentore***

- From most important to least
  1. Dome
  2. Three interior half-domes surrounding central dome
  3. Main seating area
  4. Side and rear chapels
  5. Remainder of building



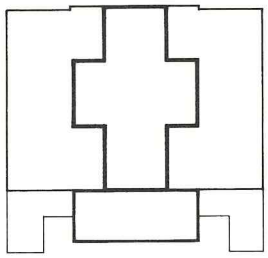
***San Giorgio***

- From most important to least
  1. Dome
  2. Altar
  3. Main seating area
  4. Transepts
  5. Remainder of Building



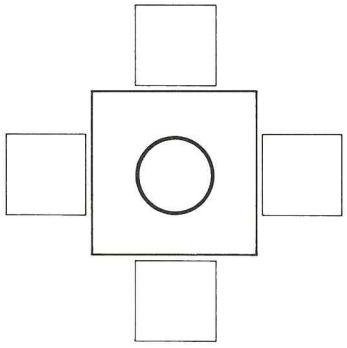
***Malcontenta***

- From most important to least
  1. Central cruciform space
  2. Portico
  3. Remainder of building
  4. Entrance stairs



***La Rotonda***

- From most important to least
  1. Dome
  2. Square comprising mass of building
  3. Porticos and stairs



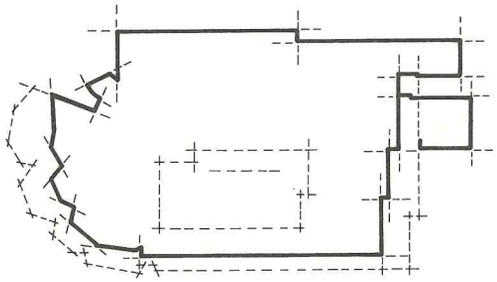
# ORDERING IDEAS

## LAYERING

Layering is the vertical or horizontal juxtaposition of parts wherein one part is in front of or on top of another. Most of the time the layers are physically distinct elements with the surfaces or limits of the elements forming the layers. However, at times the layers can be implied, resulting from color or material changes.

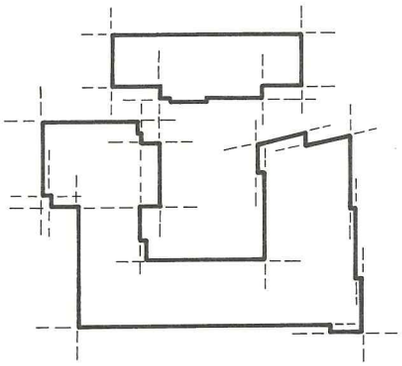
***Cultural Center***

- A series of relationships created by the configurations of exterior walls seen one against another.



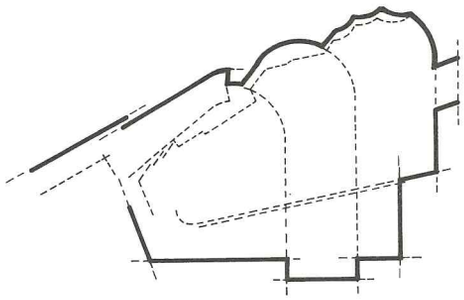
***Town Hall***

- A series of relationships created by the configurations of the exterior walls and roof planes seen one against another.



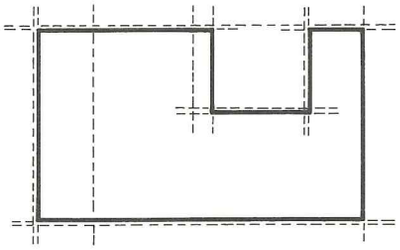
***Imatra***

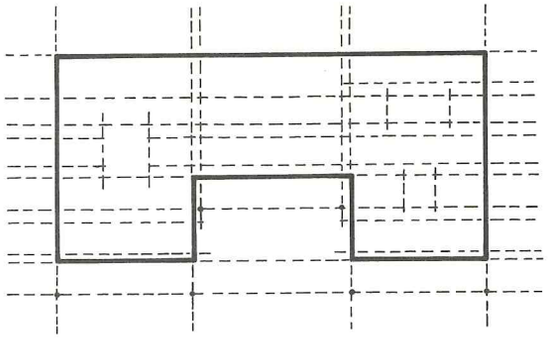
- A series of relationships created by configuration of exterior walls, wall thicknesses, and ceiling articulation seen one against another.



***Enso/Gutzeit***

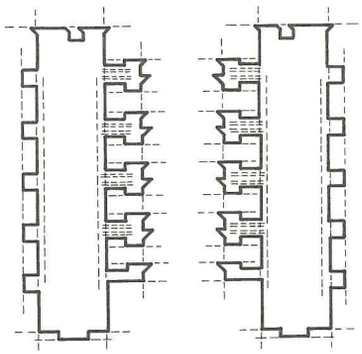
- A series of relationships that occur within the building skin, and between the walls defining exterior, entry and lightwell seen one against another.





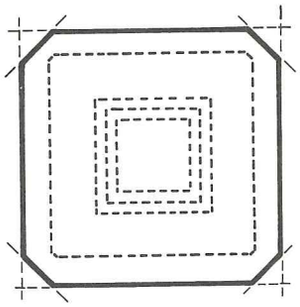
***Kimball Art Center:***

- A series of relationships in an orthogonal grid configuration that is consistent with the structural vault system.



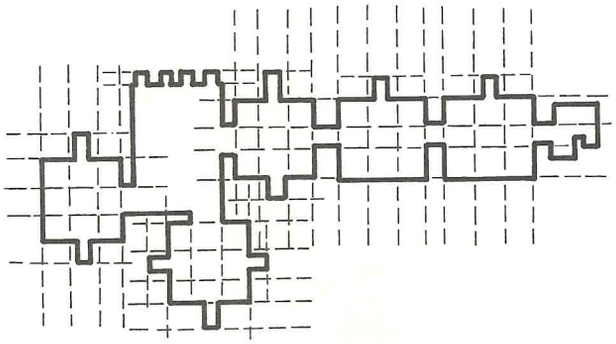
***Salk Institute***

- A series of relationships formed by the surfaces that contain and define the circulation, and the smaller building elements seen against the mass of the major use spaces.



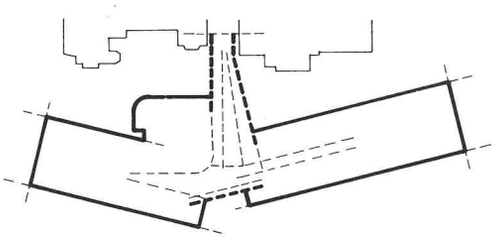
***Exeter Library***

- A series of concentric squares progressing from building skin to interior lightwell, with structural elements, furniture, space defining walls, and openings seen one against another.



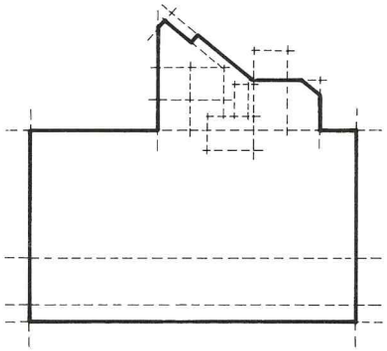
***Richards Medical Laboratory***

- A series of relationships in an orthogonal grid configuration that is consistent with the structural system, exterior walls and service towers, seen one against another.



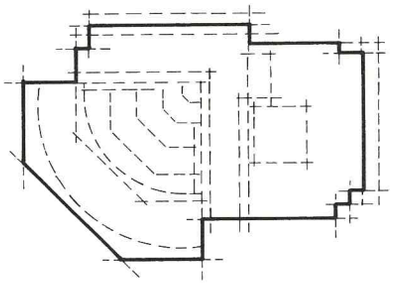
***Olivetti***

- A series of relationships created by surfaces of major circulation links seen one against another.



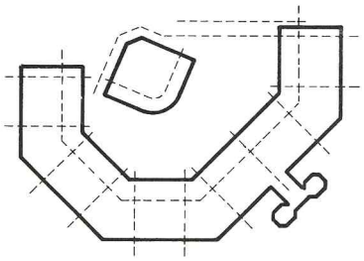
***Leicester***

- A series of relationships created by exterior surfaces seen one against another.



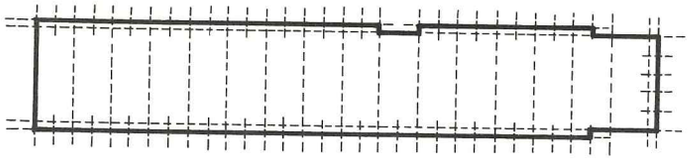
***Cambridge History***

- A series of relationships created by configuration of major glazed roof and exterior wall surfaces seen one against another.



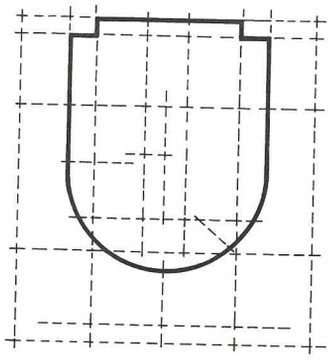
***Oxford Dorm***

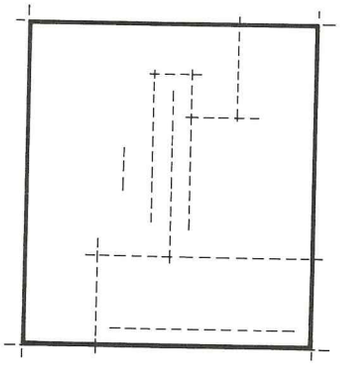
- A series of relationships created by structure and exterior wall surfaces seen one against another.



***Marseilles***

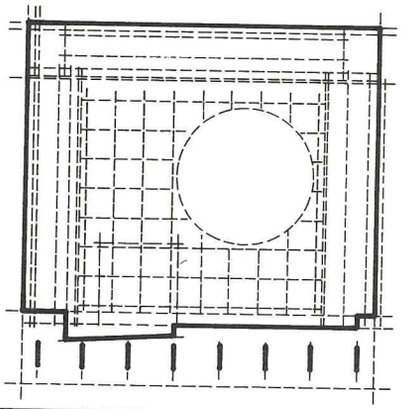
- A series of orthogonal relationships consistent with the building enclosure, sun screens, and structure seen one against another.





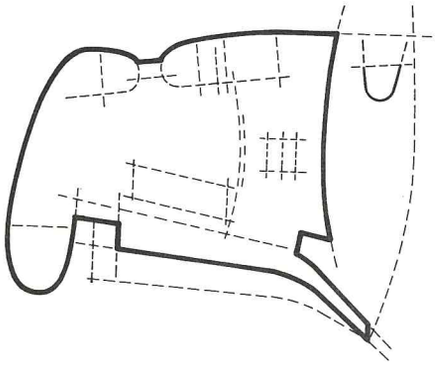
***Villa Savoye***

- A series of relationships consistent with the orthogonal structural grid, exterior enclosure, and vertical circulation seen one against another.



***Assembly at Chandigarh***

- A series of relationships consistent with the orthogonal structural grid, building enclosure, sun screening, and surfaces of interior forms and circulation seen one against another.

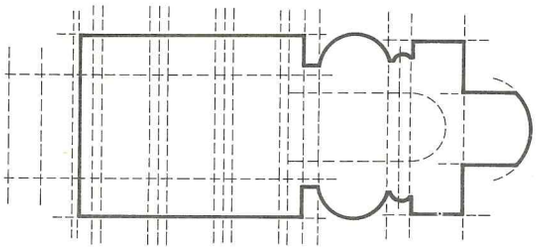


***Ronchamp***

- A series of relationships consistent with building enclosure, roof overhang, dominant interior surfaces and furnishings seen one against another.

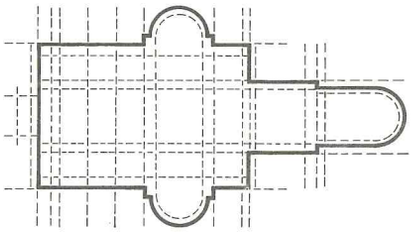
***Redentore***

- A series of relationships that are predominantly in an orthogonal configuration that is consistent with the structural elements and exterior walls seen one against another.



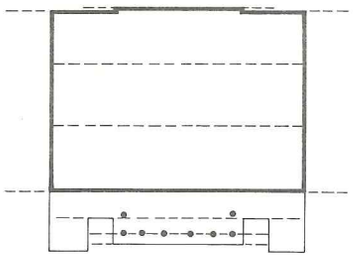
***San Giorgio***

- A series of relationships that are predominately in an orthogonal configuration that is consistent with the structural elements and exterior walls seen one against another.



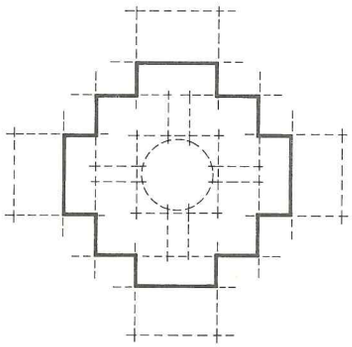
***Malcontenta***

- A series of parallel relationships formed by surfaces that articulate the entry stairs, portico, entry wall, interior walls bordering central space and rear wall.



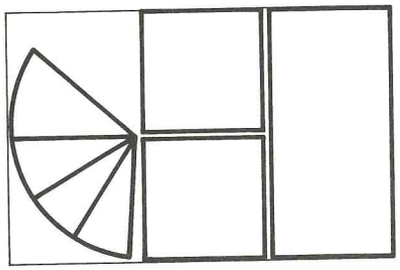
***La Rotonda***

- A series of concentric squares progressing from central space outward.

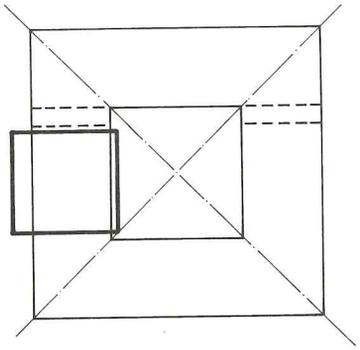


# PARTI

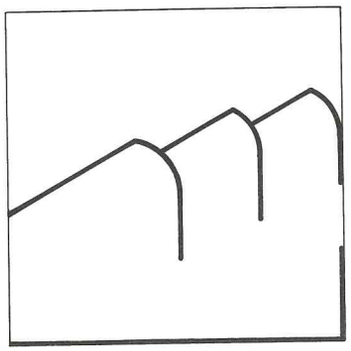
The parti is the dominant idea of the building which embodies the salient characteristics of that building. The parti diagram encapsulates the essential minimum of the design, without which the scheme would not exist, but from which the form can be generated.



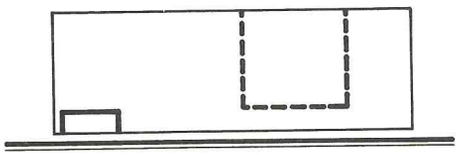
*Cultural Center*



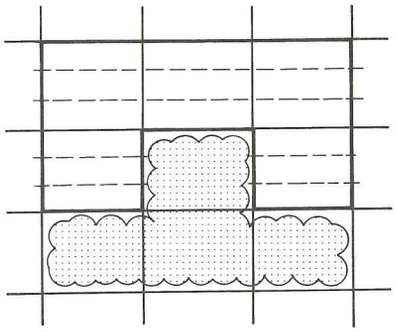
*Town Hall*



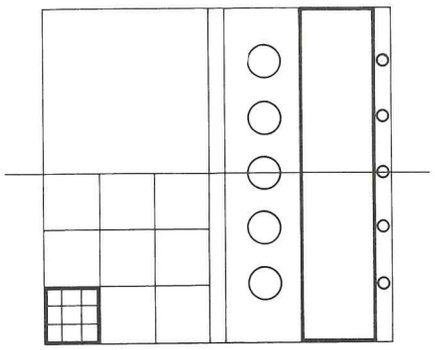
*Imatra Church*



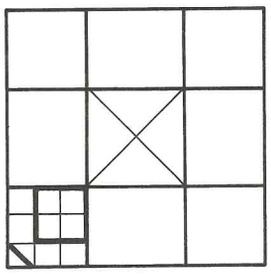
*Enso / Gutzeit*



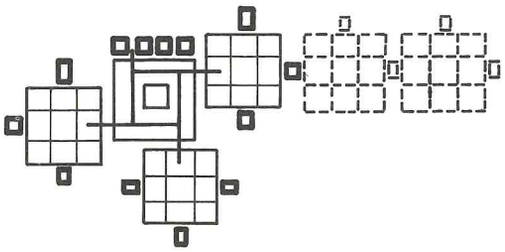
*Kimball Art Center*



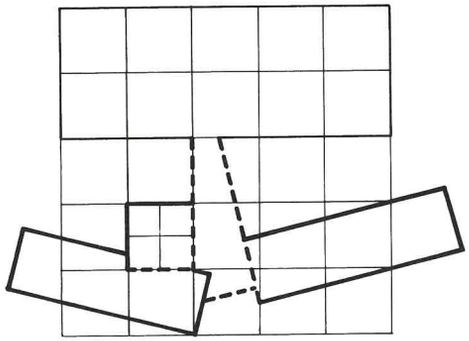
*Salk Institute*



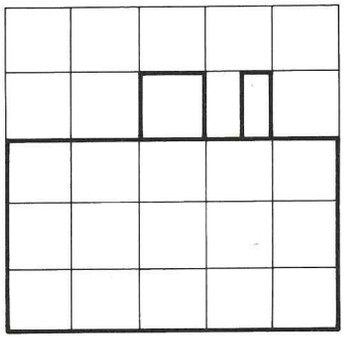
*Exeter Library*



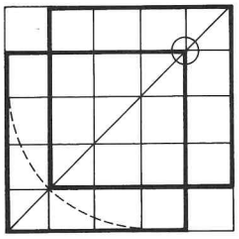
*Richards Medical Laboratory*



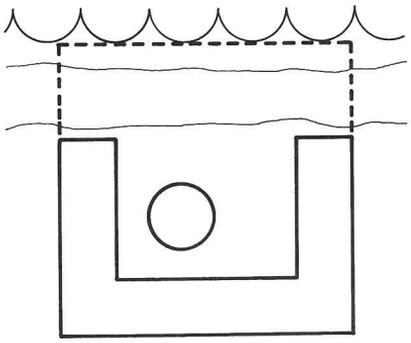
*Olivetti*



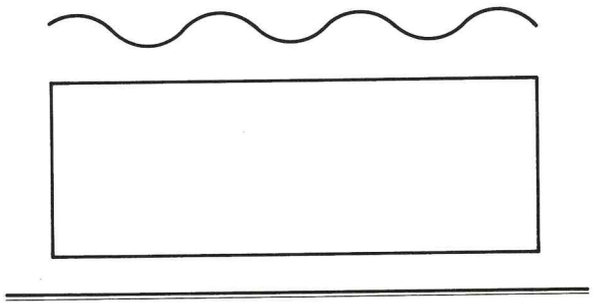
*Leicester*



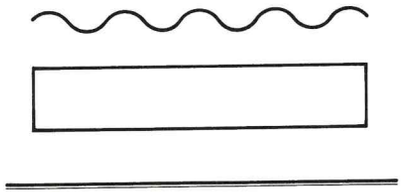
*Cambridge History*



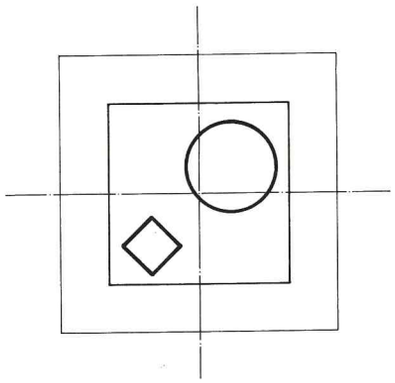
*Oxford Dorm*



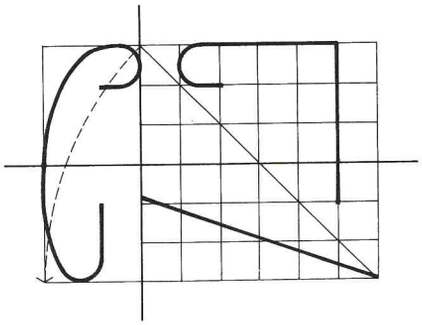
*Marseilles*



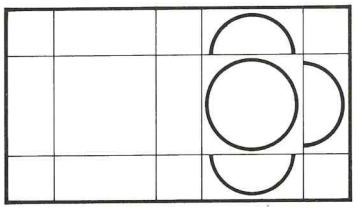
*Villa Savoye*



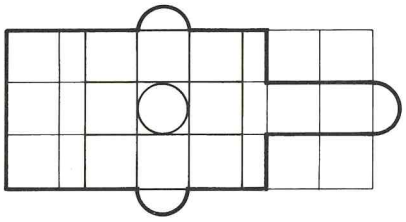
*Assembly at Chandigarh*



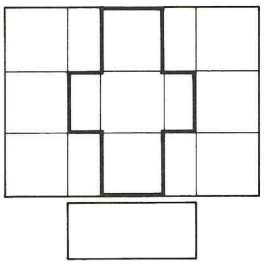
*Ronchamp*



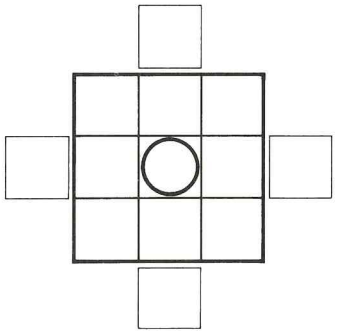
*Redentore*



*San Giorgio*



*Malcontenta*



*La Rotonda*

# ALVAR AALTO

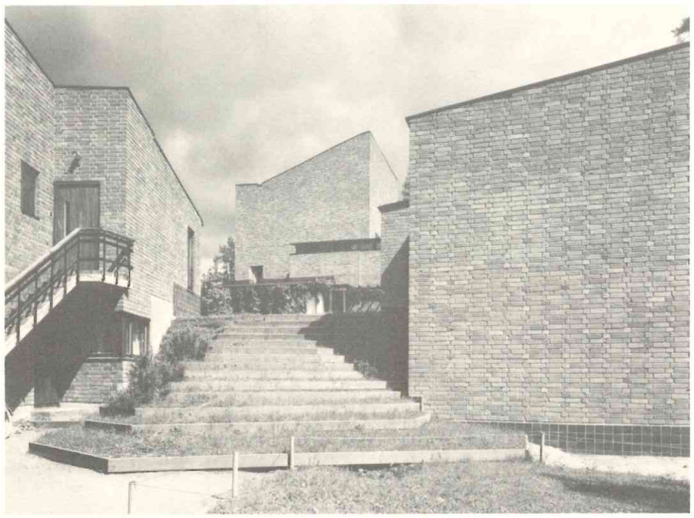
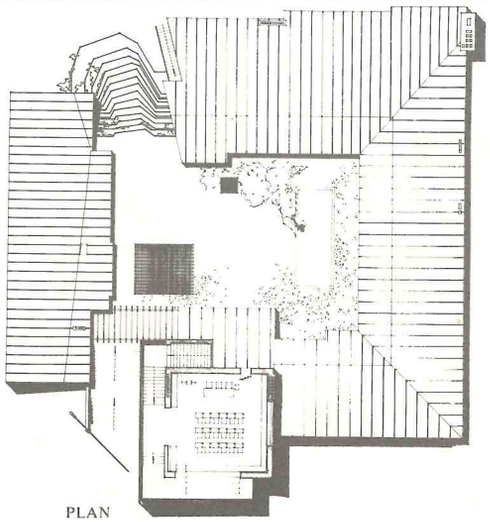
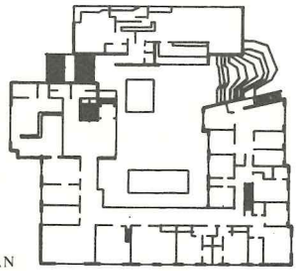


PHOTO: THE MUSEUM OF FINNISH ARCHITECTURE

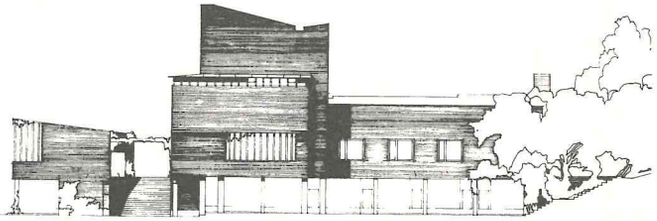


PLAN

## SAYNATSALO TOWN HALL



PLAN

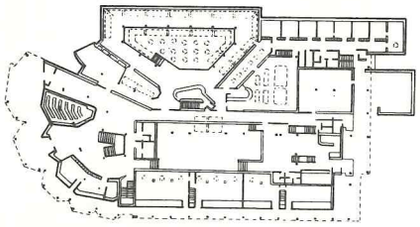


ELEVATION

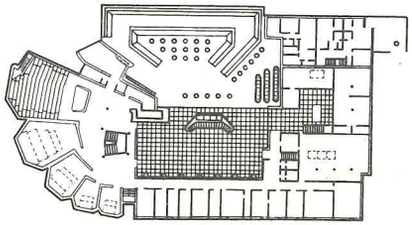
PHOTO: THE MUSEUM OF FINNISH ARCHITECTURE

SKETCH

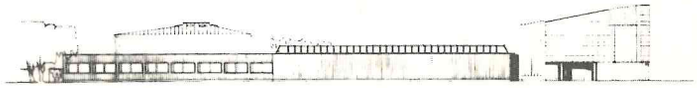
## WOLFSBURG CULTURAL CENTER



LOWER FLOOR



UPPER FLOOR



ELEVATION

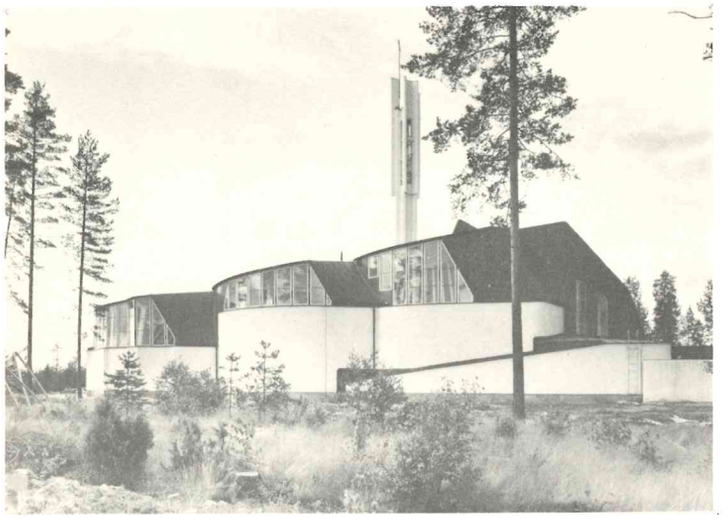
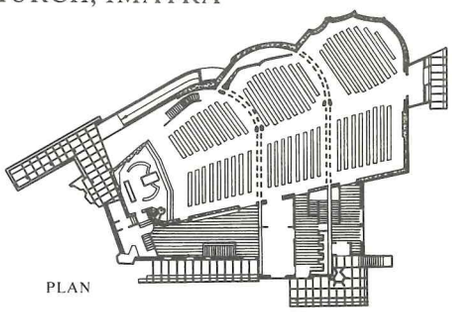
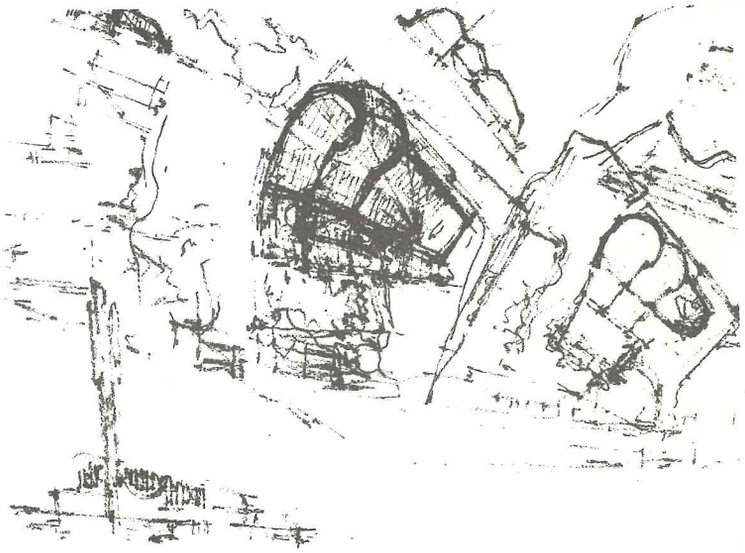


PHOTO: THE MUSEUM OF FINNISH ARCHITECTURE

VOUKSENNISKA CHURCH, IMATRA



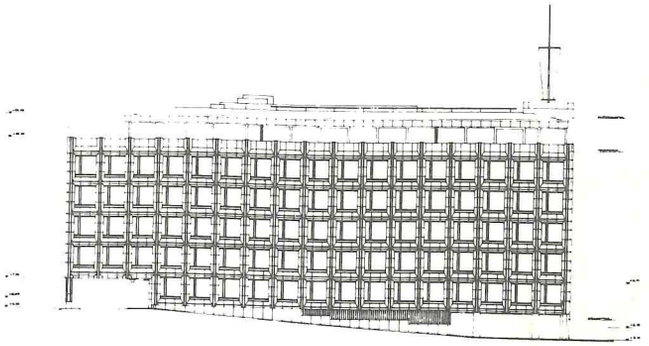
PLAN



DEVELOPMENTAL SKETCHES

PHOTO: THE MUSEUM OF FINNISH ARCHITECTURE

ENSO/GUTZEIT OFFICE BUILDING



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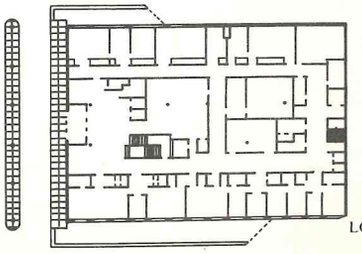
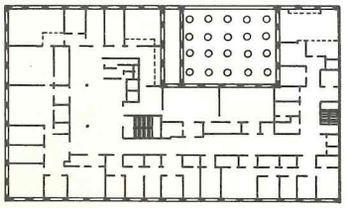
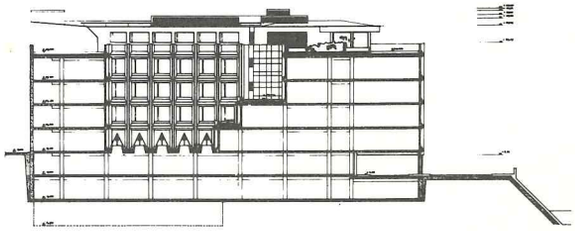


LOWER FLOOR



UPPER FLOOR



SECTION

# LOUIS KAHN

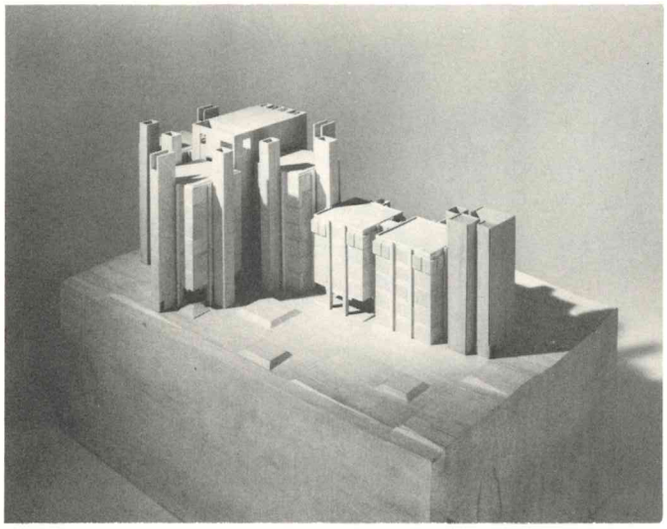
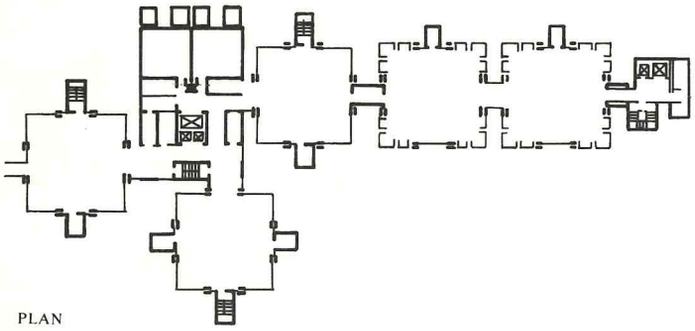


PHOTO: THE MUSEUM OF MODERN ART

RICHARDS MEDICAL CENTER

SKETCH

PHOTO: THE MUSEUM OF MODERN ART



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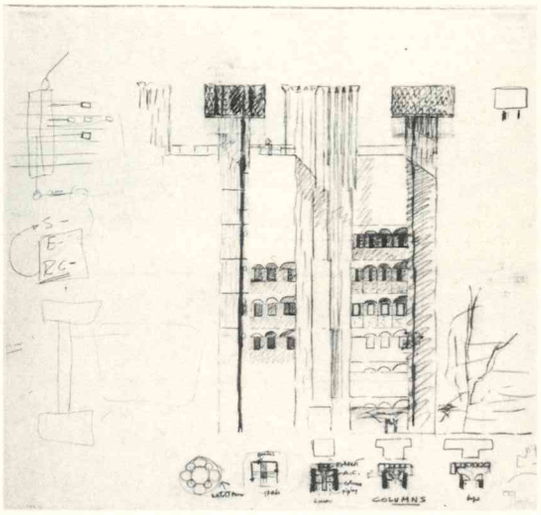

DETAILS

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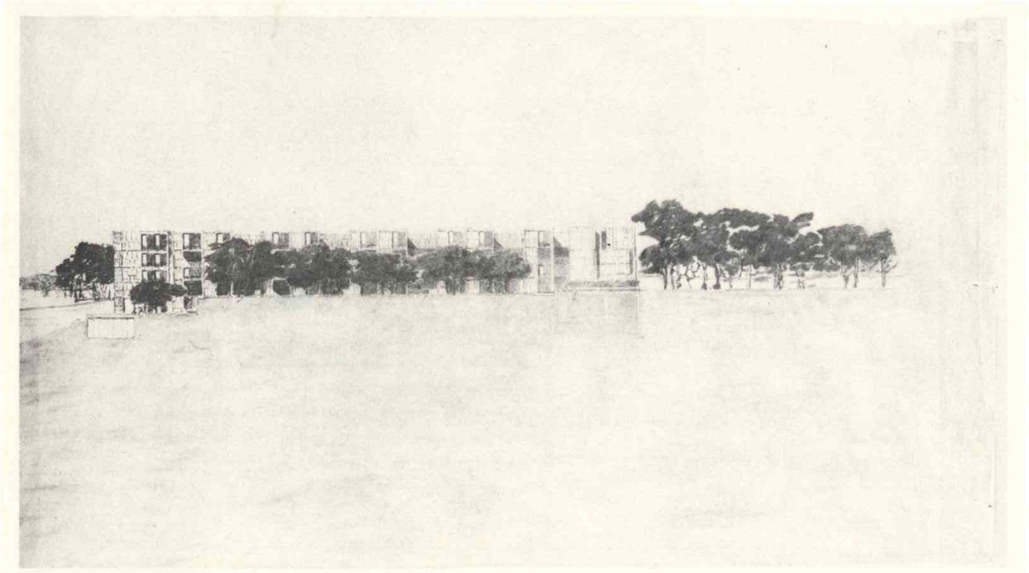

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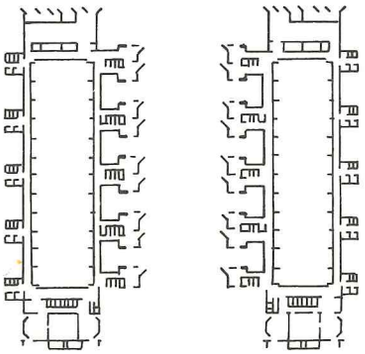
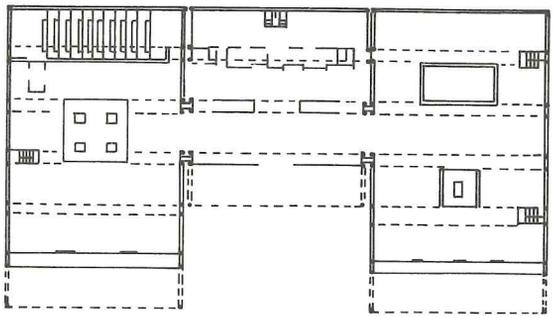
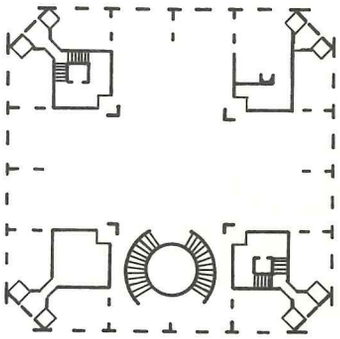


SALK INSTITUTE

## LOUIS KAHN

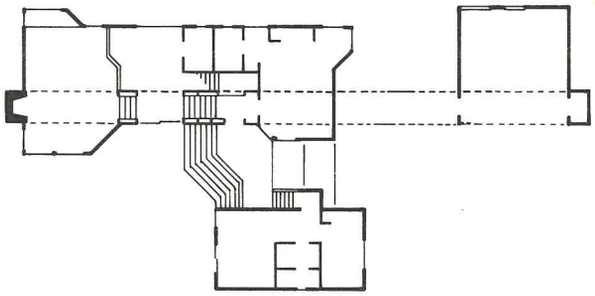


KIMBELL ART MUSEUM



EXETER LIBRARY

## CHARLES MOORE



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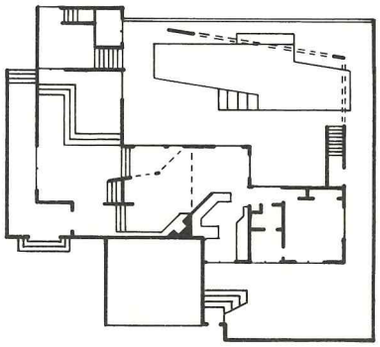

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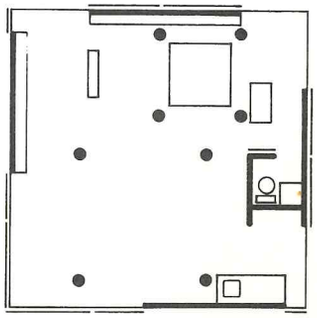

MOORE HOUSE

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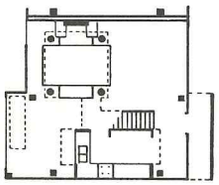

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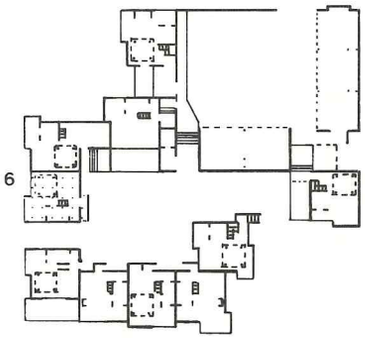
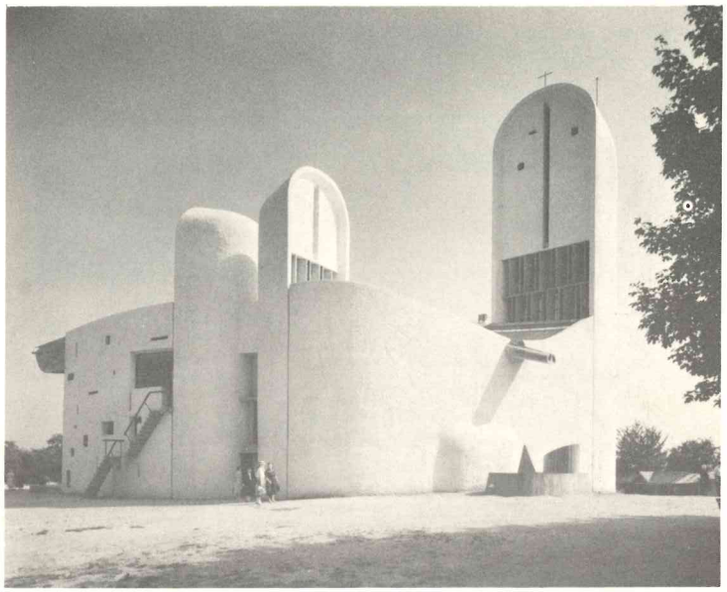


SEA RANCH

# LE CORBUSIER

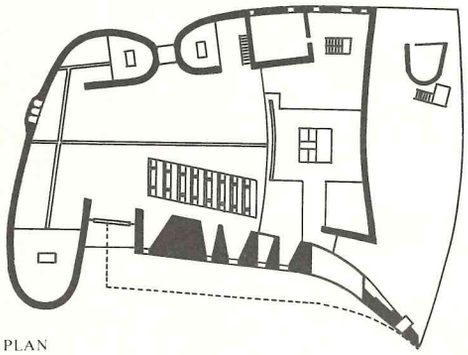
PHOTO: ENNA STOLLER



EXTERIOR VIEW

PHOTO: ENNA STOLLER

NOTRE DAME du HAUT, RONCHAMP



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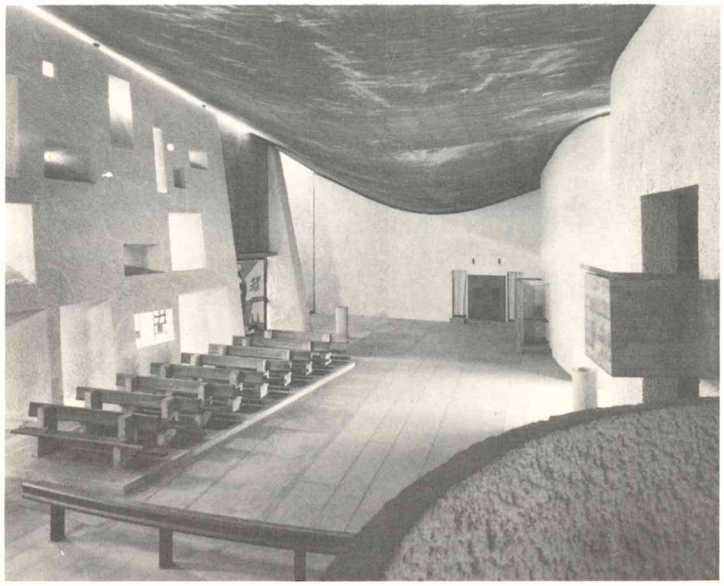


INTERIOR VIEW

PHOTO: ENNA STOLLER

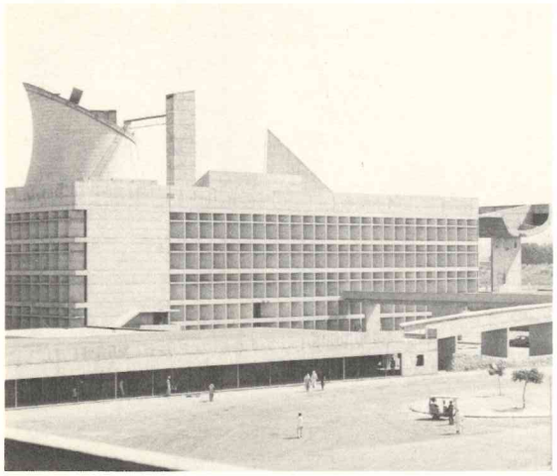
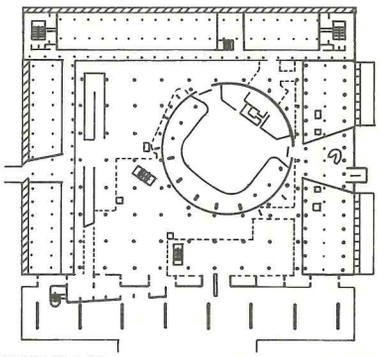


PHOTO: COURTESY HEIDI WEBER GALLERY, MUNICH SWITZERLAND



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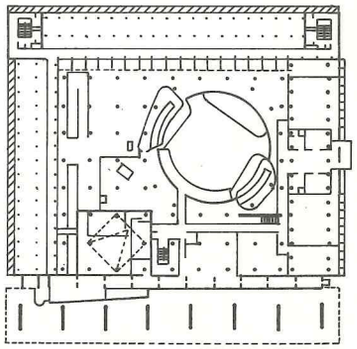


UPPER FLOOR

ASSEMBLY BLDG., CHANDIGARH

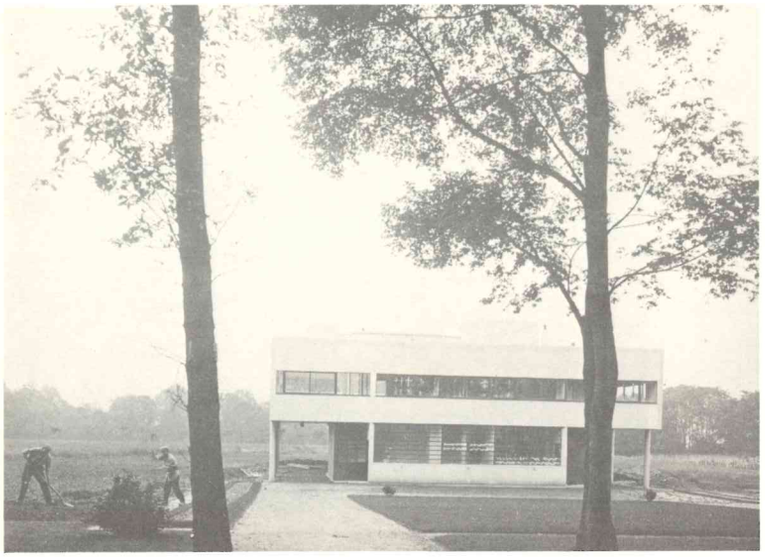


PHOTO: THE MUSEUM OF MODERN ART

VILLA SAVOYE AT POISSY

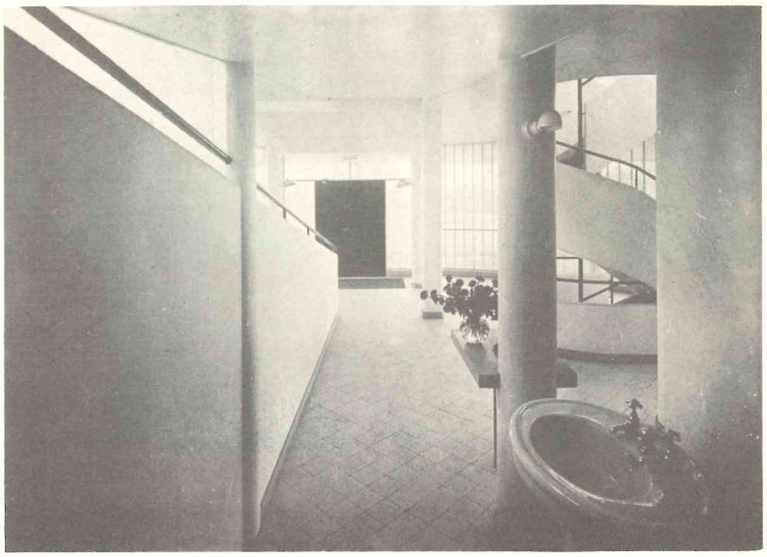
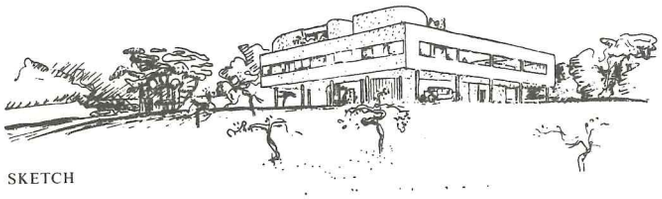


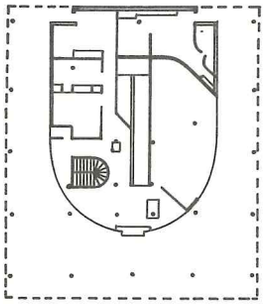
PHOTO: THE MUSEUM OF MODERN ART

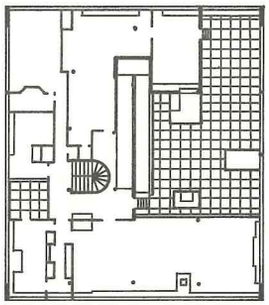
INTERIOR VIEW

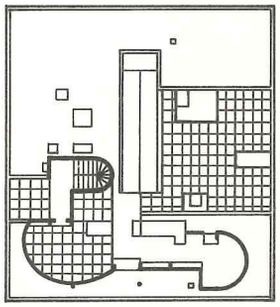


SKETCH

FLOOR PLANS







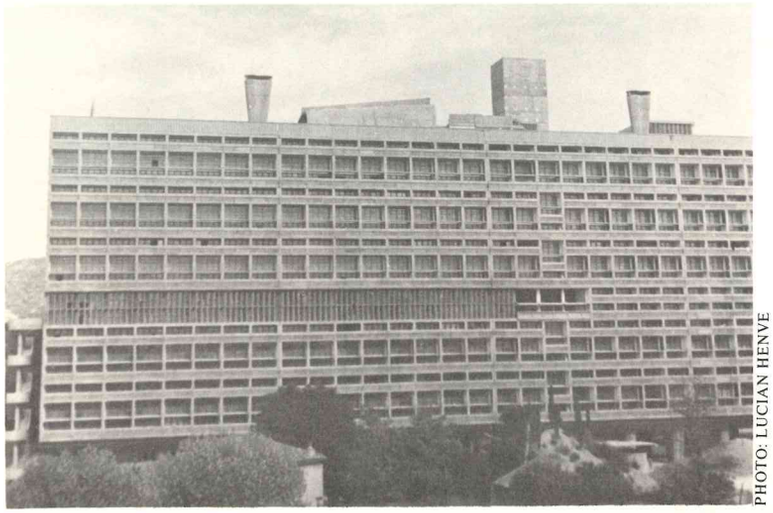
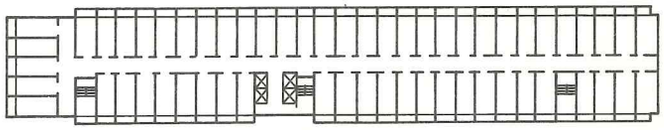


PHOTO: LUCIAN HENVE

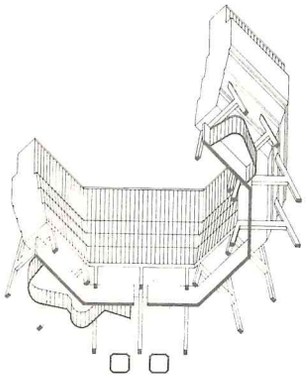


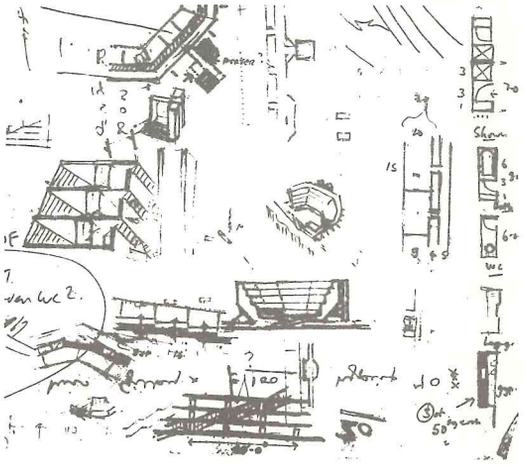
TYPICAL UPPER FLOOR

UNITE d'HABITATION, MARSEILLES

# JAMES STIRLING

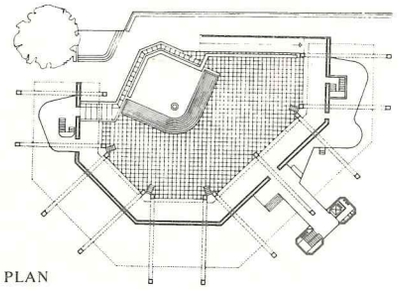
PHOTO: BRECHT-EINNIG LIMITED



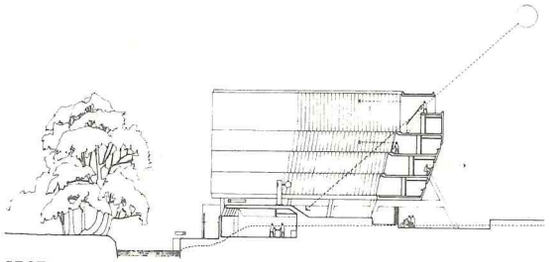


DEVELOPMENTAL SKETCHES

## QUEENS COLLEGE DORMITORY



PLAN



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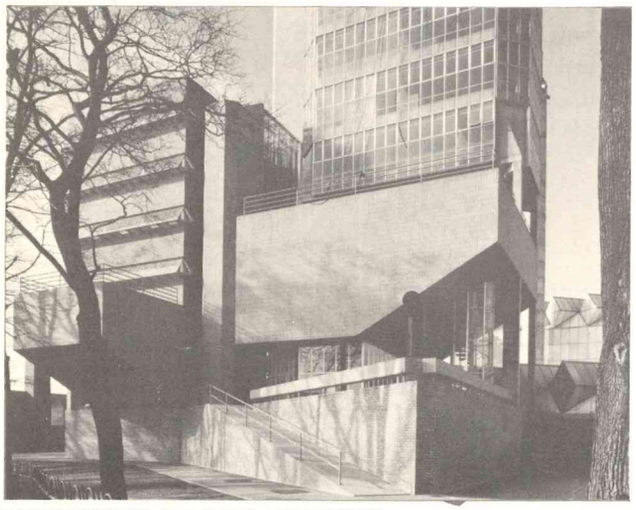
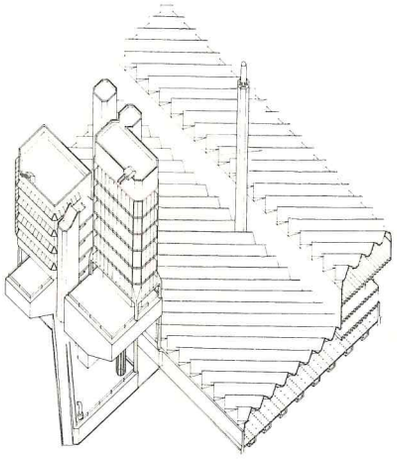
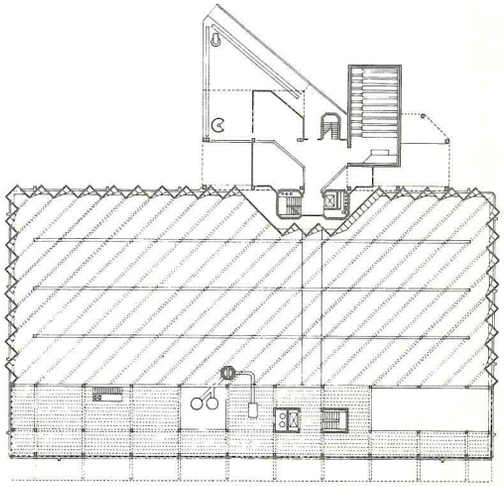


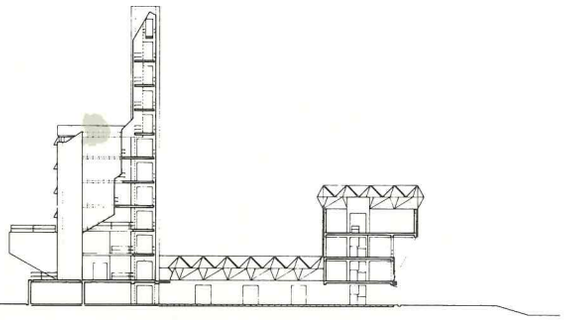
PHOTO: BRECHT-EINNIG LIMITED





PLAN

## LEICESTER LABORATORIES



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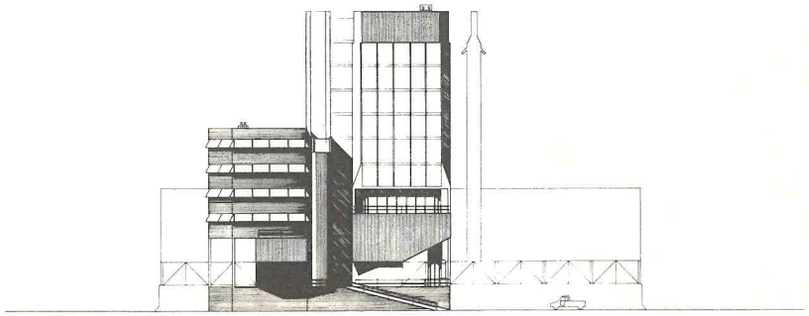
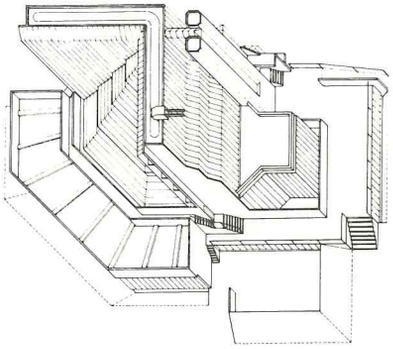
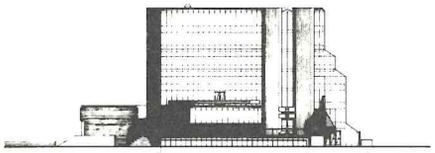


ELEVATION

PHOTO: BRECHT-EINNIG LIMITED



## CAMBRIDGE HISTORY FACULTY BLDG.



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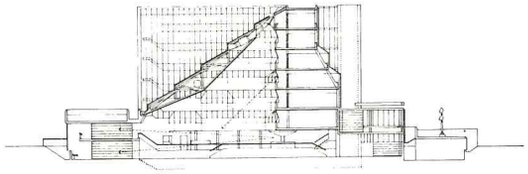

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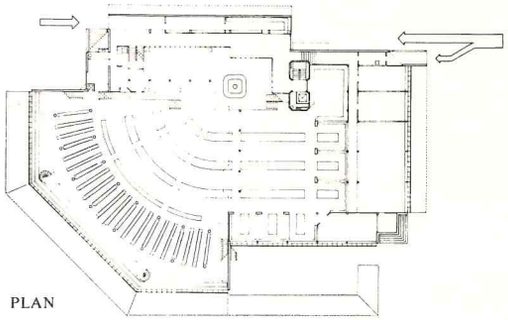

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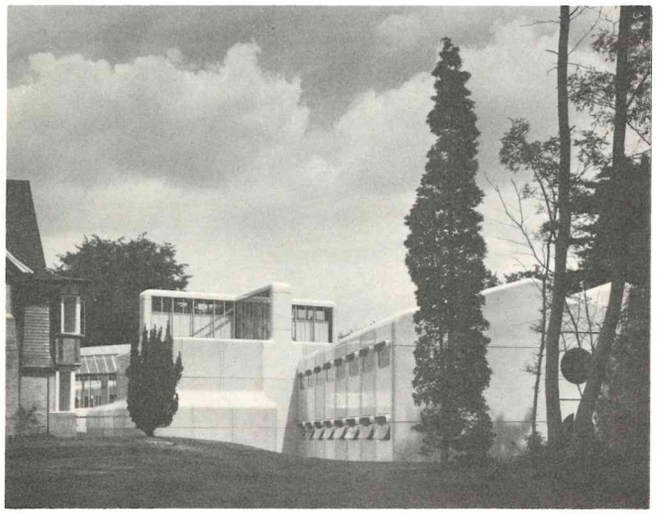
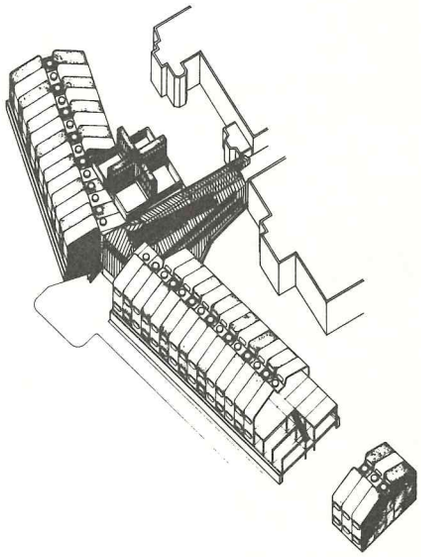
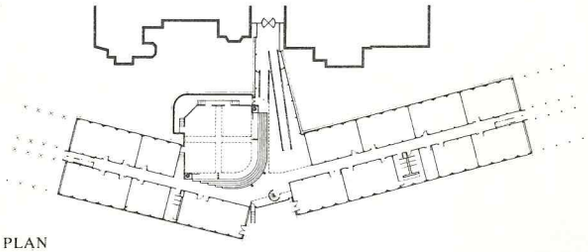


PHOTO: BRECHT-EINNIG LIMITED

SECTION



## OLIVETTI TRAINING CENTER



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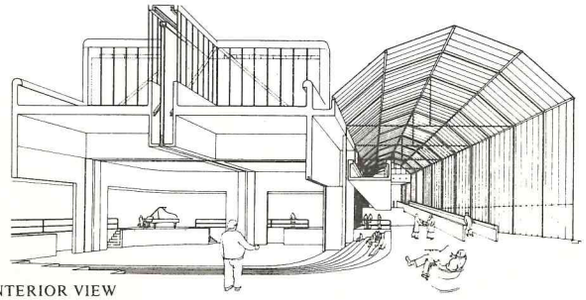
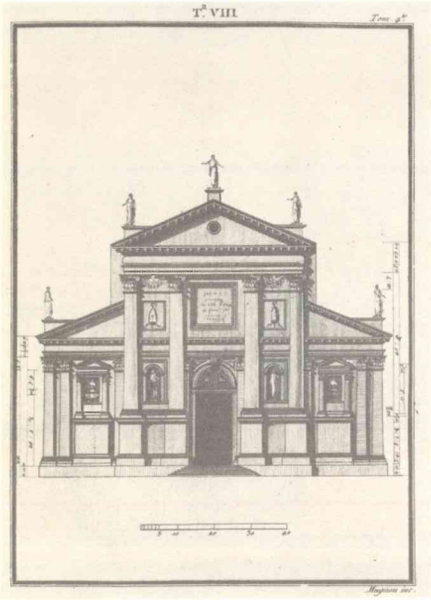


INTERIOR VIEW

# ANDREA PALLADIO

## SAN GIORGIO MAGGIORE

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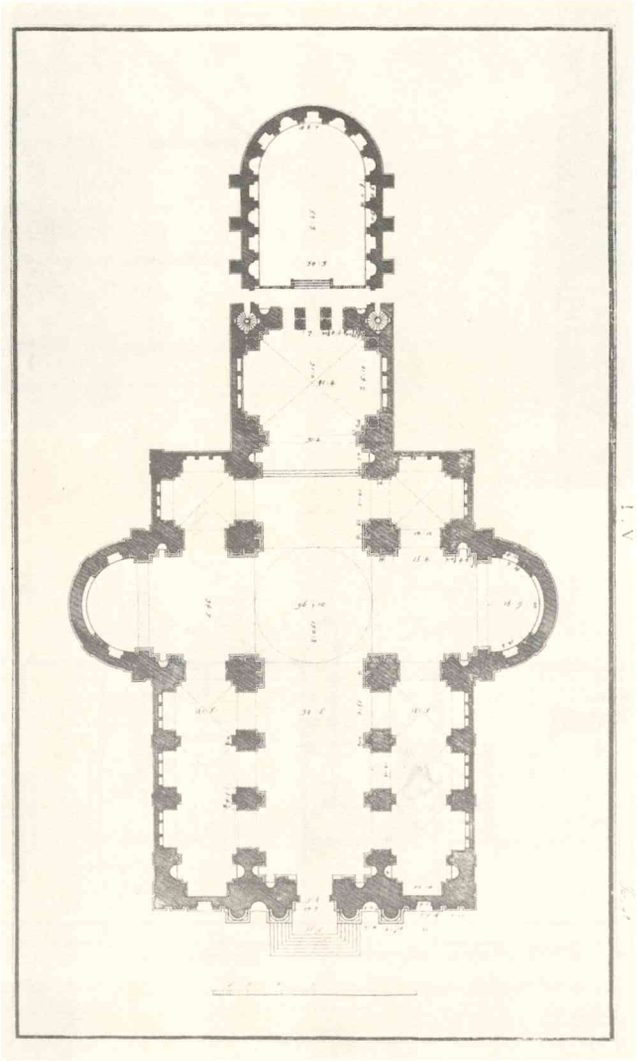

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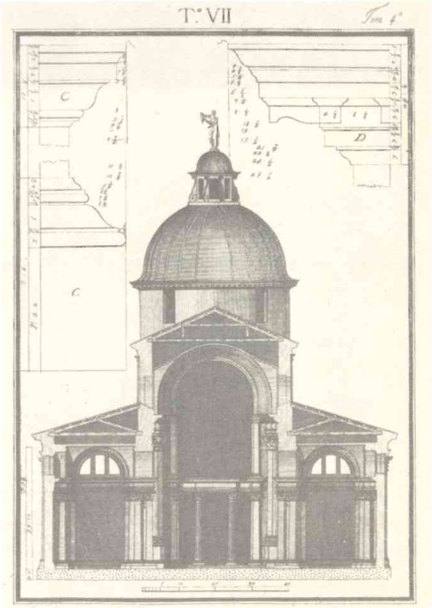


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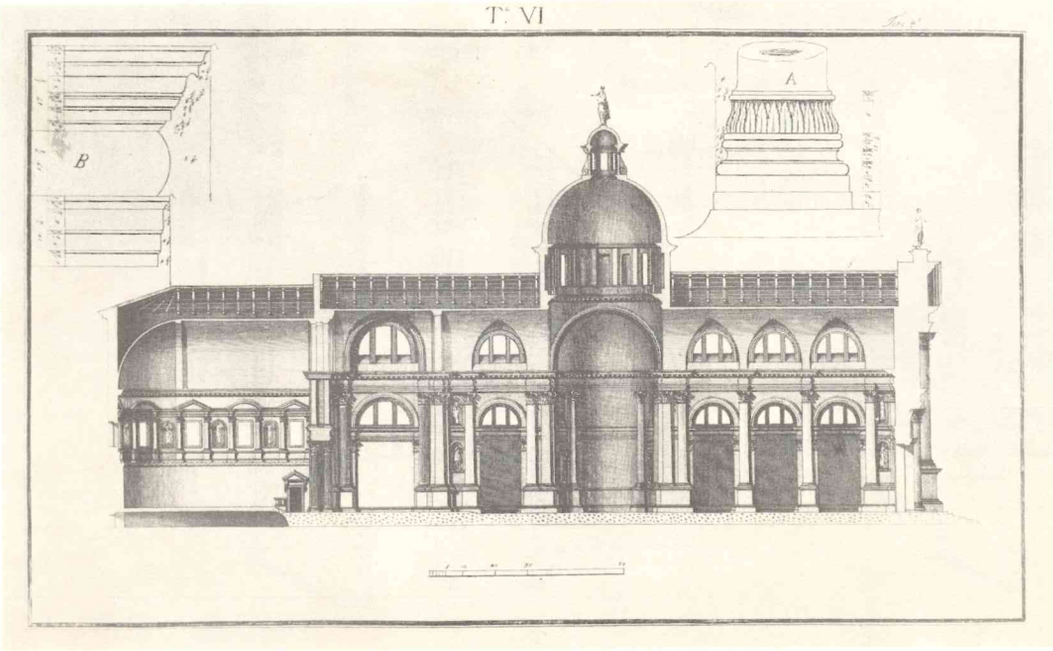


SECTION

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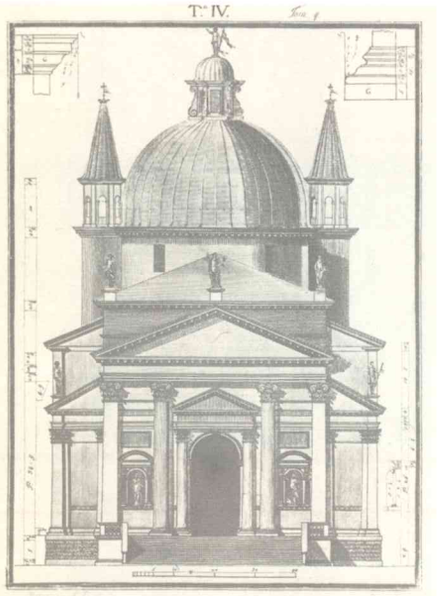
## U REDENTORE

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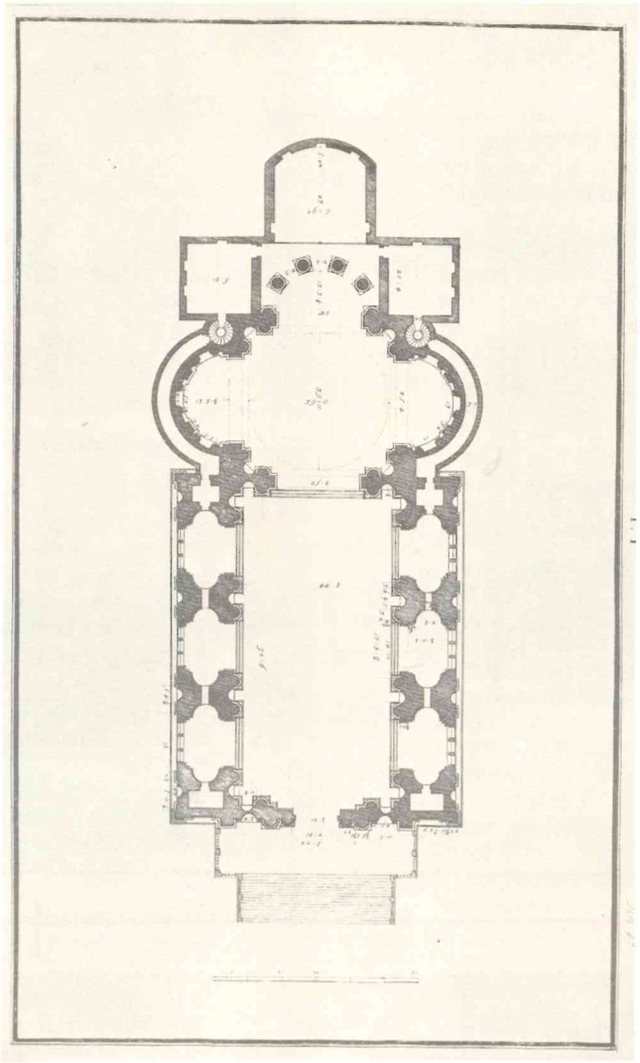

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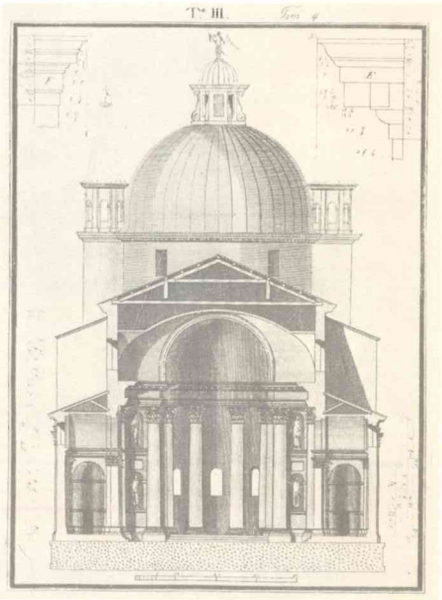


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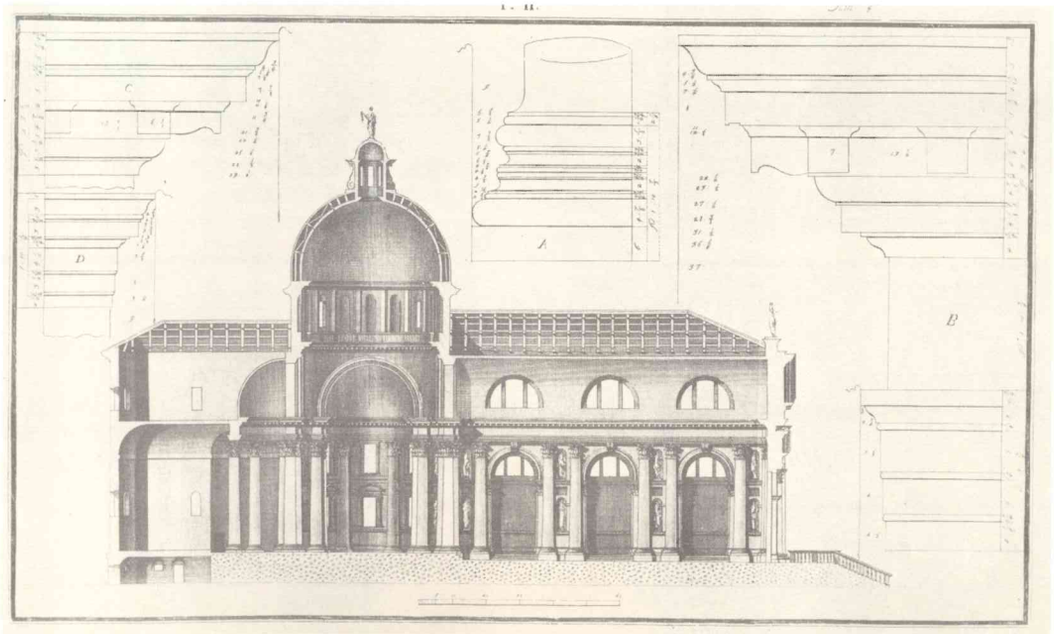


SECTION

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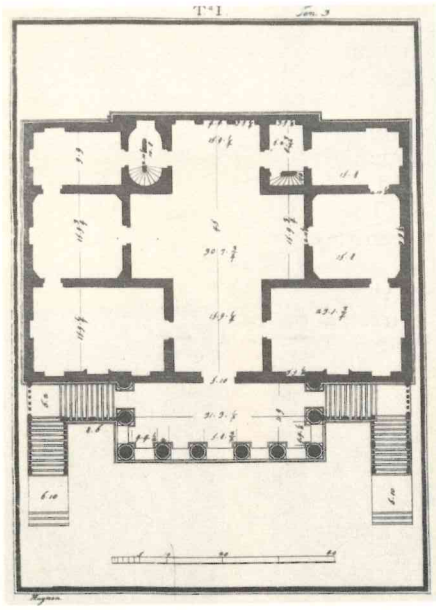

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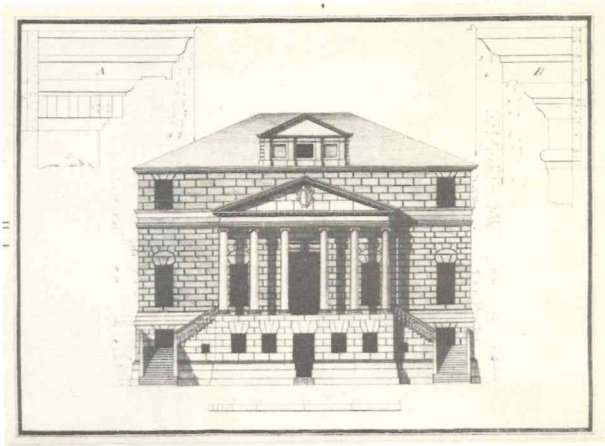

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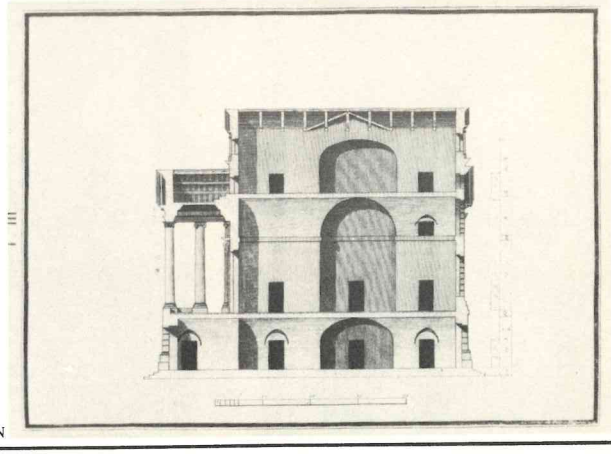

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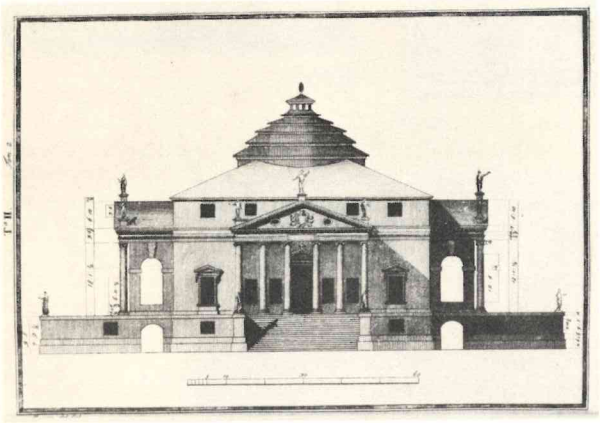

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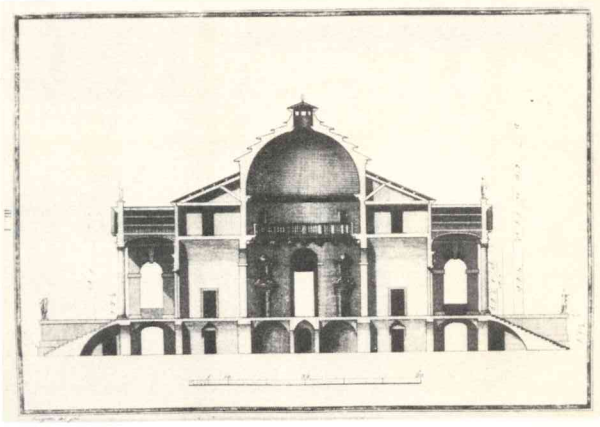

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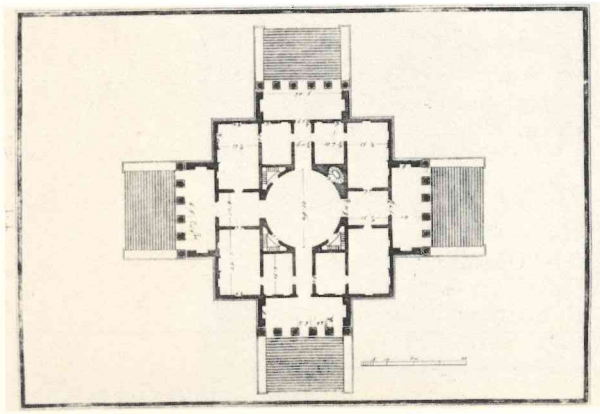

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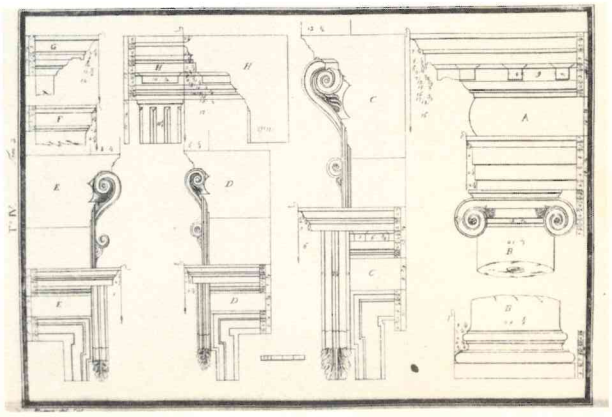

DETAILS

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